



# Series 6800

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*Copyright*



## Product Reference Guide

70-32645-01

Revision A

April 1998



***Series 6800***  
***Product Reference Guide***

70-32645-01

*Revision A*

*April 1998*



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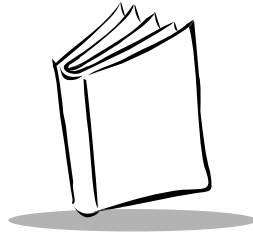
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One Symbol Plaza  
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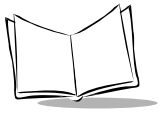
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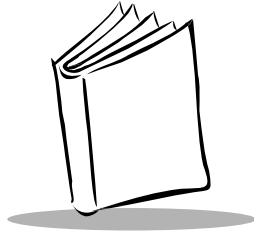
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*Series 6800 Product Reference Guide*



## About This Manual

The *Series 6800 Product Reference Guide* provides general instructions for setup, initialization, operation, troubleshooting, and maintenance of the Series 68XX terminal.

## Notational Conventions

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The following conventions are used in this document:

- ◆ "Operator" and "User" refer to anyone using an application on a Series 68XX terminal.
- ◆ "PC" refers to the IBM personal computer or compatible system that you are using to develop applications.
- ◆ "Terminal" refers to a Series 68XX hand-held computer.
- ◆ "You" refers to the administrator who is using this manual as a reference aid to install, configure, operate, maintain, and troubleshoot the Series 68XX.
- ◆ Keystrokes in bold type indicate non-alphanumeric keystrokes on the PC.
- ◆ **Bold** type is used to identify menu items and input or text fields on a terminal screen.
- ◆ Italics are used:
  - ◆ for the names of parameters in function prototypes and variable names in usage and syntax descriptions
  - ◆ to highlight specific items in the general text
  - ◆ to identify chapters and sections in this and related documents
- ◆ The piping symbol | has the effect of "or" when it is used to separate inline parameters on a command line; i.e., it separates alternative values for parameters.
- ◆ Bullets (•) indicate:
  - ◆ action items
  - ◆ lists of alternatives
  - ◆ lists of required steps that are not necessarily sequential



- ◆ Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

## Related Publications

---

The following is a list of documents and publications that you may find useful if you want to know more about the Series 6800 terminals or about the tools and utilities that are available for writing applications for the terminals.

### ***Documents Available from Symbol Technologies***

- ◆ *Series 6800 Quick Reference Guide*, 70-32644-XX
- ◆ *38/6860 Charging and Communications Module Quick Reference Guide*, 70-33400-XX
- ◆ *Cradle Base Unit 38/6865 Quick Reference Guide*, 70-33401-XX
- ◆ *Cradle Base Module 38/6866 Quick Reference Guide*, 70-33402-XX
- ◆ *Printer Interface Module Quick Reference Guide*, 59164-00-82
- ◆ *Series 3000 Application Developer's Kit (ADK):*
  - ◆ *Series 3000 Application Programmer's Guide*, 70-16308-XX
  - ◆ *Series 3000 Application Programmer's Reference Manual*, 70-16309-XX
  - ◆ *Series 3000 System Software Manual*, 70-16310-XX
  - ◆ *Series 3000 Application Developer's Library*, 70-16311-XX
- ◆ *Spectrum24 Access Point User's Guide*, 70-12057-XX
- ◆ *Spectrum24 Network Terminal Technical Reference Guide*, 70-20193-XX
- ◆ *Novell LAN Workplace Reference Manual*, 70-20288-XX
- ◆ *Spectrum24 TNClient System Administrator's Guide*, 70-20244-XX
- ◆ *Spectrum24 STEP Installation and Configuration Guide for Series 3000 Flash Disk Terminals*, 70-20343-XX

## Service Information

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If you have a problem with your equipment, contact the Symbol Support Center. Before calling, have the model number, serial number, and (if necessary) several of your bar code symbols at hand.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly and the problem is symbol readability, the Support Center will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given specific directions.

---

**Note:** *Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent to you.*

---

## Symbol Support Center

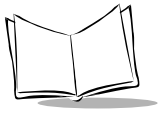
In the U.S.A, for service information, warranty information or technical assistance, call:

### USA

SYMBOL SUPPORT CENTER  
1-800-653-5350

### Canada

Mississauga, Ontario  
Canadian Headquarters  
(905) 629-7226



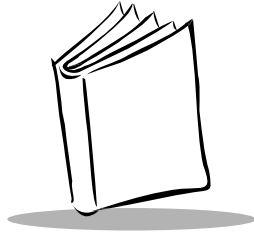
## ***Europe***

Symbol Place  
Winnersh Triangle  
Berkshire RG41 5TP UK  
+44 1189 45 7222 (outside UK)  
0 1189 45 7222 (inside UK)

## ***Asia***

Singapore  
Symbol Technologies Asia, Inc.  
337-6588 (Inside Singapore)  
+65-337-6588 (Outside Singapore)

If you purchased your Symbol product from a Symbol Business Partner, contact that Business Partner for service.

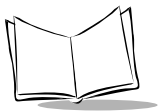


## *Chapter 1*

# *The Series 68XX System*

Symbol Technologies' 68XX terminals are hand-held, battery-powered, portable data collection devices. Data is entered from the 68XX's keyboard or through the integrated laser scanner. As a remote terminal, the 68XX terminal collects and stores data that is later uploaded to a host computer. The 6800 is a batch computer (no radio). Radio terminals include the 6810 for use in a Spectrum One<sup>®</sup> network and the 6840 for the Spectrum24<sup>®</sup> radio network environment.

68XX terminals use Caldera's DR DOS<sup>™</sup> operating system that is compatible with and extends Microsoft<sup>®</sup> MS-DOS<sup>®</sup>. Although 68XX terminals are MS-DOS feature compatible, they are not one hundred percent MS-DOS compatible. DR DOS provides access to a number of commercially available programming tools. Additional programming tools are available from Symbol for easier programming and access to special features.



## Terminal Parts and Basic Operation

The following paragraphs describe the parts and accessories of the 68XX terminals. For information on the 38/6860, 38/6865, and 38/6866 cradles, refer to the individual guides listed in *Related Publications*. For information about the PC Adapter, refer to [Chapter 2](#).

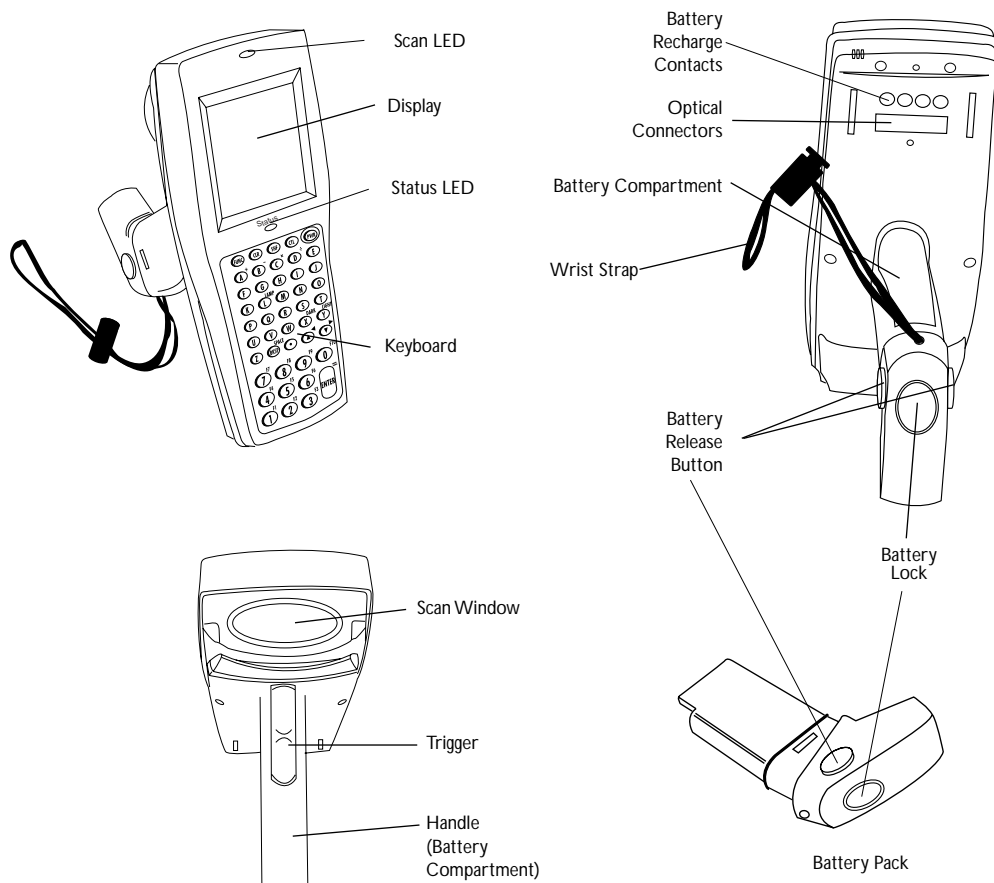


Figure 1-1. 68XX Terminal Parts

## ***Display***

The display shows sixteen 21-character lines — alphabetical characters, numerals, and symbols. Changing the contrast on the display is also available, as is back lighting if your program allows it (refer to the section [Back Lighting on page 5-6](#)).

## ***Keyboard***

The keyboard contains all the operating and data entry keys. Refer to the section [The Keyboard on page 5-6](#) for more keyboard information.

## ***Battery Pack Compartment***

This compartment houses a NiCd battery pack or a carrier containing one 9-Volt alkaline battery.

## ***Battery Recharge Contacts***

These contacts are used to recharge the battery pack in the terminal while it is in a cradle or connected to the PC Adapter. Refer to Chapter 6 for more information on battery charging.

## ***Optical Connector***

The optical connector in the terminal aligns with the optical connector in the cradle terminal slot or the Printer Interface Module (PIM) to enable the terminal to send and receive data or to print.

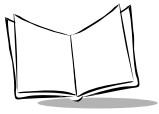
## ***Trigger***

Pull the trigger to power on the terminal or to scan bar codes.

## ***Wrist Strap***

Place the wrist strap over your wrist to help you hold the terminal.





## Accessories

---

The following accessories are available for 68XX terminals.

### Battery Chargers

68XX terminals use a five-cell 780 mAh or six-cell 600 mAh (intrinsically safe) Nickel Cadmium (NiCd) battery. NiCd batteries are charged using one of the charging accessories listed below.

### Cradles

Cradles combine a communications device and battery charger, and are available with either one or four slots.

- ♦ 38/6860 Charging and Communications Module (CCM) — Four-slot module for charging NiCd battery packs in the terminal and spare battery packs; also performs communications between terminals and a host, modem, or printer. Refer to Chapter 2, *Hardware Setup*.
- ♦ 38/6865 Cradle Base Unit — Single-slot cradle for charging NiCd battery packs; also performs communications between terminals and a host, a modem, or a printer. Refer to Chapter 2, *Hardware Setup*.
- ♦ 38/6866 Cradle Base Module — Four-slot cradle for charging NiCd battery packs in the terminal and for communicating between terminals and a host, a modem, or a printer. Refer to Chapter 2, *Hardware Setup*.

### UBC Chargers

The NiCd battery pack can be recharged in a UBC 1000 or 2000 battery charger.

### Printer Interface Module (PIM)

The Printer Interface Module works with the PC Adapter to perform communications between the terminal and a host PC or a printer without a cradle. Refer to the section [The PC Adapter on page 2-16](#).

### PC Adapter

The PC Adapter works with the PIM to communicate with the host PC without a cradle or to charge a NiCd battery pack in the terminal without a cradle. Refer to the section [The PC Adapter on page 2-16](#).

## **Radio and Network Options**

### **Spectrum One Network**

The 6810 includes an internal radio frequency transmitter/receiver for use in a Symbol Spectrum One network.

### **Spectrum24 Network**

The 6840 includes an internal radio frequency transmitter/receiver for use in a Symbol Spectrum24 network.

## **Unpacking**

---

Remove the clear protective tape from the display and the optical connector.

Save the shipping container for later storage or shipping. Inspect all equipment for damage and make sure you have received everything listed on the packing slip.

If you find anything unsatisfactory or missing, contact your authorized customer support representative immediately.



## Before You Use the Terminal

---

The first time you use your 68XX terminal, or the first time you power it on after it has been stored without the battery pack, follow these steps in order.

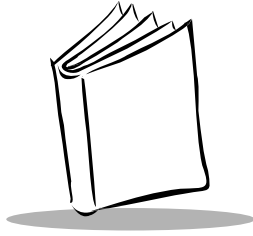
### ***Install and Charge the Battery***

1. Install a battery pack in the terminal. Refer to [Chapter 6, \*Maintaining the Series 68XX\*](#), for instructions.
2. If you hear a repeated tone or see a message on the display, recharge or replace the battery pack. [Refer to Chapter 6, \*Maintaining the Series 68XX\*](#), for more information.

### ***Load the Appropriate Software***

What software you load and how you load it depends on the environment in which it will be used:

- ♦ If this unit is intended for use in batch applications (68XX) or in a Spectrum One network environment (6810), refer to [Chapter 3, \*Batch and Spectrum One Terminal Setup\*](#), for information on downloading the software.
- ♦ If this unit is intended for use in a Spectrum24 network environment (6840), refer to [Chapter 4, \*Spectrum24 RF Terminal Setup\*](#), for information on downloading the software.



## *Chapter 2*

### *Hardware Setup*

The CRD 38/6865 and CRD 38/6866 cradles and Charging and Communications Module (CCM) 38/6860 provide RS-232 communication, charging, and storage capability for the Series 68XX terminals.

The PC adapter provides charging and communication capability for a Series 68XX terminal.

This chapter provides instructions for setting up each of these devices for charging the 68XX's NiCd battery, and for communicating with a host, printer, or modem.



## 38/6865 and 38/6866 Cradles

---

Before attempting to mount or connect the cradles, verify that you have the following parts:

### **CRD 6865**

- ✓ Single-Slot Cradle with Charging Slot:
  - ◆ US Kit: 3865-110
  - ◆ International Kit: 3865-111
- ✓ AC Power Supply
  - ◆ US:59915-00-00
  - ◆ International: 60507-00-00
- ✓ Null Modem Cable, DB 25 Male to DB 25 Female (p/n 25-19297-01)
- ✓ Null Modem Cable DB25 Male to DB 9 Female (p/n 25-19299-01)
  
- ✓ Wall Mounting Kit (p/n 3866-000)

### **CRD 6866**

- ✓ Four-Slot Cradle
  - ◆ US Kit: 3866-100
  - ◆ International Kit: 3866-101
- ✓ AC Power Supply
  - ◆ US:60153-00-00
  - ◆ International: 60174-00-00
- ✓ Null Modem Cable, DB 25 Male to DB 25 Female (p/n 25-19297-01)
- ✓ Null Modem Cable DB25 Male to DB 9 Female (p/n 25-19299-01)
- ✓ Chaining Interconnect Cable (p/n 60427-00-00)
- ✓ Two Wall Mounting Kits (p/n 3866-000) per 38/6866

## Parts of the 38/6865 Cradle

Figure 2-1 shows the parts of the CRD 38/6865.

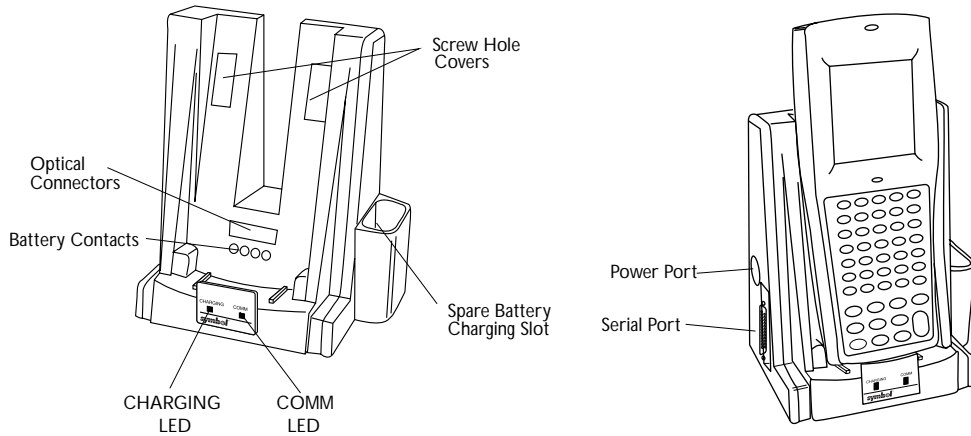


Figure 2-1. Parts of the CRD 38/6865

## Parts of the 38/6866 Cradle

Figure 2-2 shows the parts of the CRD 38/6866.

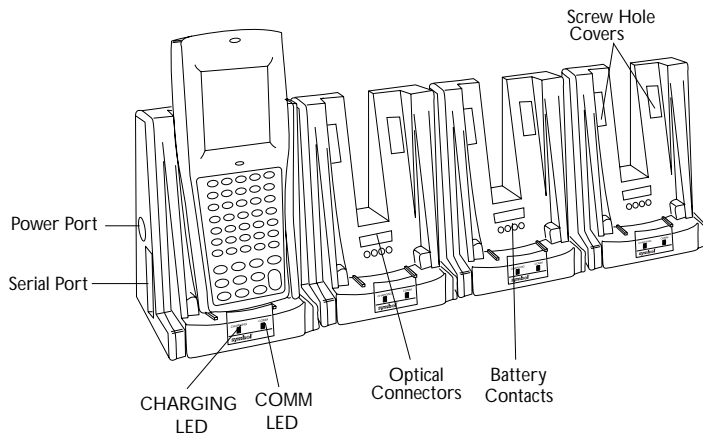
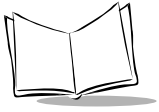


Figure 2-2. Parts of the CRD38/6866



## Wall Mounting the 38/6865

The CRD 38/6865 can be wall-mounted on a wall bracket for convenience. To wall-mount the 38/6865:

1. Mark where you want the cradle positioned on the wall.
2. Using a fastener appropriate to the wall construction, insert and secure the fastener (Figure 2-3). Let the head protrude slightly.

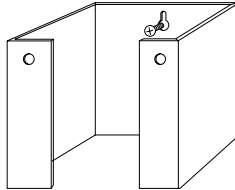


Figure 2-3. Wall Mounting the 38/6865

3. Slide the bracket down over the head of the fastener.
4. Remove the black tape covers from the cradle screw holes (Figure 2-4).

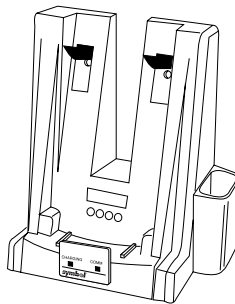
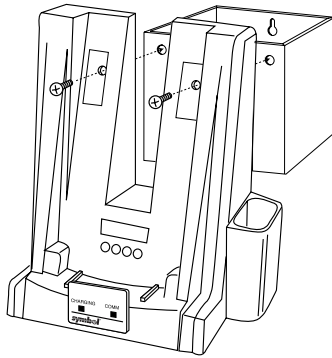


Figure 2-4. Removing the Tape Covers

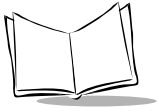
5. Position the cradle on the bracket.



**Figure 2-5. Secure Cradle to Bracket**

6. Secure the cradle to the bracket using two #10 metal screws ([Figure 2-5](#)).





## Table Mounting the 38/6866

---

**Note:** *Installing the suction cup feet is not mandatory but helps keep the cradle in place.*

---

1. On the bottom of the cradle, thread each of the four suction cup feet into the screw holes.
2. Wet the base of each suction cup and secure the cradle to a smooth tabletop by pushing firmly down on the cradle (Figure 2-6).



Figure 2-6. Installing Suction Cups on the CRD 38/6866

## Wall Mounting the 38/6866

The 38/6866 can be wall-mounted on two mounting brackets. Follow the directions for wall mounting the 38/6865 cradle on page 2-4, using two brackets.

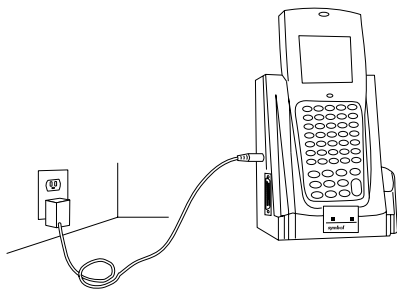
## Connecting Power for the 38/6865 and 38/6866

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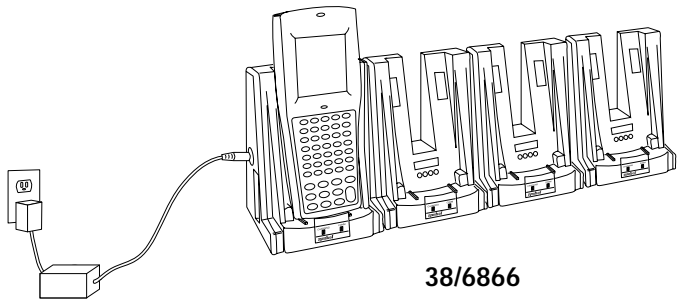
**Note:** *The process for connecting power is the same for both cradles.*

---

1. Connect the power supply cord's round plug to the power connector on the left side of the cradle.
  2. Connect the power supply's AC plug to a standard electrical outlet.
- The green and red indicators light for 3 seconds, blink for 3 seconds, then go out.

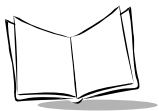


**38/6865**



**38/6866**

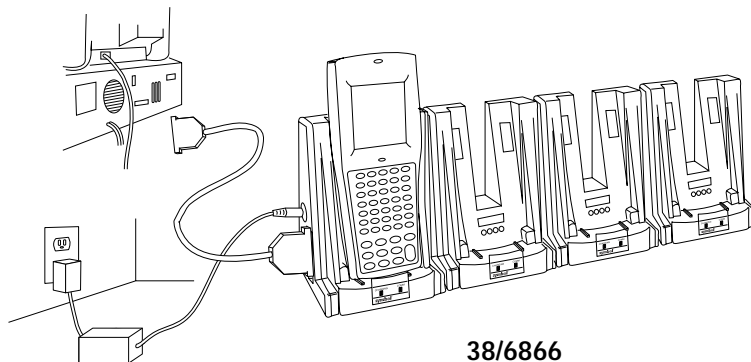
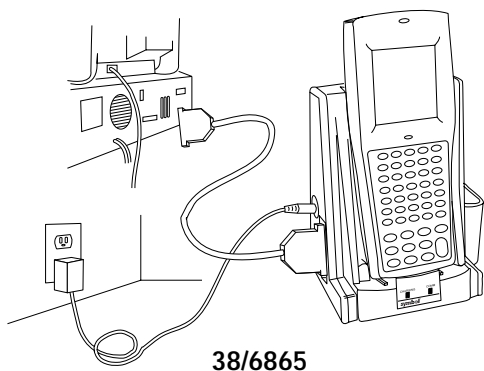
**Figure 2-7. Connecting the 38/6865 and 38/6866 to a Power Source**



## Connecting for Data Communications

To connect the CRD 38/6865 or CRD 38/6866:

1. Be sure to unplug the cradle's power supply before connecting the serial cables.
2. Turn off the PC.
3. Plug the RS-232 serial cable's DB-25 connector in the cradle's communication port ([Figure 2-8](#)).
4. Connect the cable's other connector to the host computer's serial (COMM) port.
5. Reconnect the cradle's power supply



**Figure 2-8. Connecting the 38/6865 and 38/6866 Cradles for Communications with Computer, Printer, or Modem**

## Connecting the CRD 6866 to Other Cradles

Up to twenty-five 38/6866 cradles can be connected in a series using an RS-232 inter-cradle cable (p/n 60427-00-00) between each cradle.

### Caution

Each cradle must have its own power supply; any other power hook-up method is unsafe.

1. Plug one end of the inter-cradle cable into the communication port located on the right end of the first cradle.
2. Plug the other end of the inter-cradle cable into the communication port located below the power connector on the left end of the second cradle.
3. Connect the power supply to the second cradle as described in [Connecting Power for the 38/6865 and 38/6866](#).
4. Repeat the above steps for any additional cradles being added to the chain.

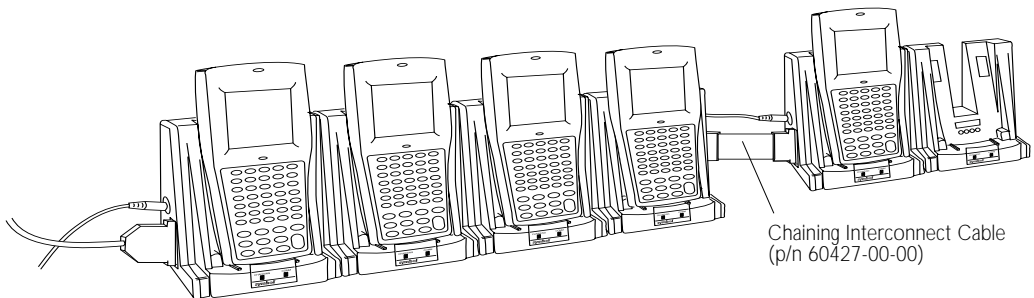
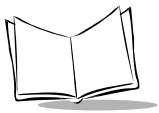


Figure 2-9. Connecting the 38/6866 to Other Cradles



## 38/6860 CCM

Before attempting to mount or connect the cradles, verify that you have the following parts:

- ✓ Four-slot CCM Kit (includes power supply, mounting brackets, and hardware)
  - ◆ US: 3860-100
  - ◆ International: 3860-101
- ✓ AC Power Supply
  - ◆ US: 58690-00-00
  - ◆ International: 58690-01-00
- ✓ Null Modem Cable
  - ◆ DB-25 Female to DB-25 Female (p/n 59846-00-00)
  - ◆ DB-25 Female to DB-9 Female (p/n 25-19298-01)
- ✓ CCM Four-Slot Add-on Kit (includes CCM, coupling kit, and mounting brackets)
  - ◆ p/n 3861-101

### Parts of the CCM 38/6860

Figure 2-10 shows the parts of the CCM 38/6860.

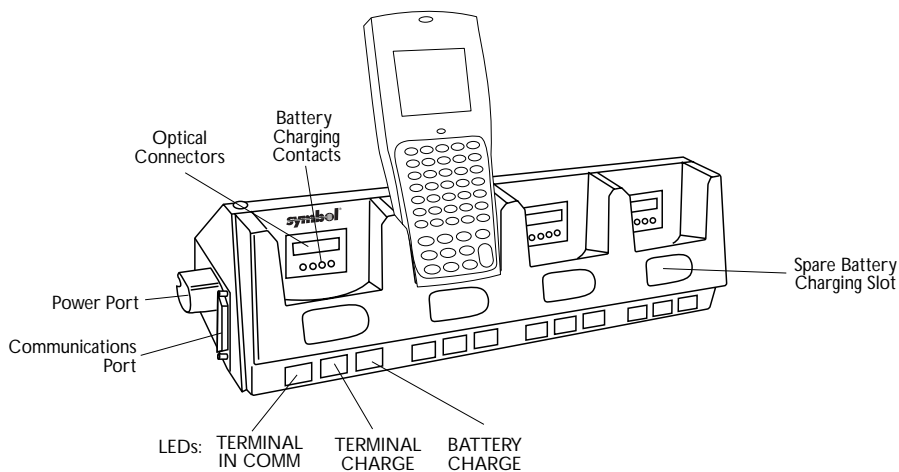


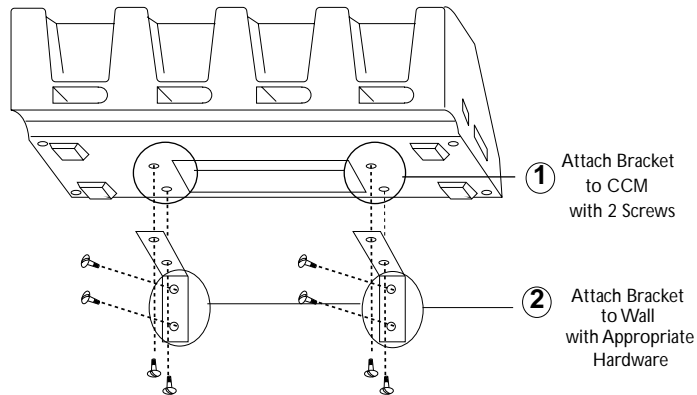
Figure 2-10. Parts of the CCM 38/ 6860

## Wall Mounting the CCM

The CCM 38/6860 can be table or wall mounted.

To wall mount the CCM:

1. Attach the wall-mounting brackets to the bottom of the CCM using the four cross-head machine screws provided, as shown in Figure 2-11:



**Figure 2-11. Wall Mounting the CCM**

2. Position the CCM with attached brackets on the wall.
3. Insert the appropriate wall-mounting hardware into the bracket holes as shown in Figure 2-11 and secure.

---

**Note:** *Appropriate wall-mounting hardware to be provided by customer.*

---



## Coupling CCMs

Up to four 38/6860 CCMs can be coupled together for table or wall mounting, with power provided by a single power supply attached to the left-most CCM. To couple two or more CCMs for table or wall mounting:

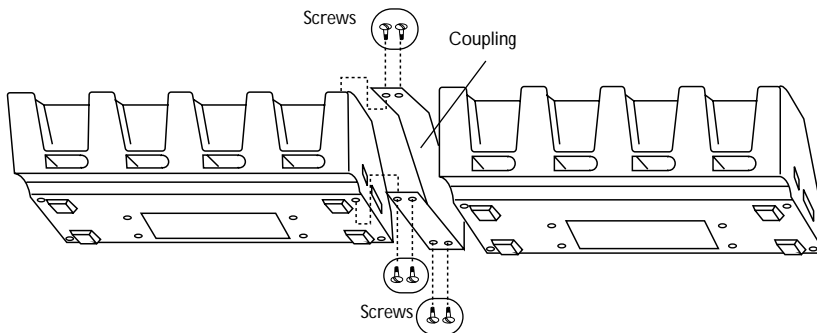
1. Verify that add-on 3861-101 kit contains the following parts:
  - ♦ 1 CCM
  - ♦ 1 coupling bracket
  - ♦ 6 cross-head screws
  - ♦ 2 flat-head screws
2. On the add-on (or right-hand) CCM, use 3/16-inch driver to remove the jack screws securing the communications port, **ONE AT A TIME**, and replace them with the flat-head screws.

---

**Note:** *Be sure to remove the jack screws one at a time; otherwise, the connector will fall into the housing.*

---

3. Mate the power port on the right side of the first cradle with the power port on the left hand side of the second cradle.
4. Place the coupler between the CCMs, aligning the holes in the coupler to the holes in the CCM's base (Figure 2-12).
5. Install 6 cross-head screws through the coupler into the CCMs and tighten.
6. If you wish to wall mount the coupled CCMs, proceed as directed in *Wall Mounting the CCM*.

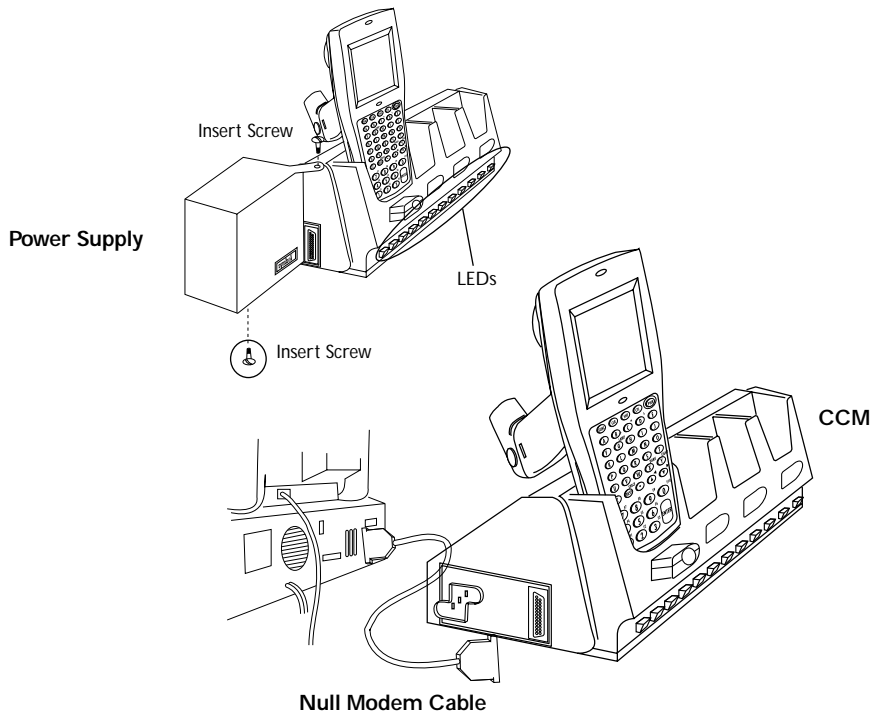


**Figure 2-12. Coupling Two CCMs**

## Connecting Power to the 38/6860 CCM

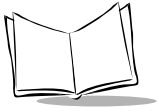
Only the power connection is required for charging batteries in the CCM.

1. Install the power supply.
  - a. Attach the power supply to the left side of the CCM as shown in Figure 2-13 using two cross-head screws.
  - b. Connect the power supply plug to an AC wall outlet.
2. When the CCM is connected to power, all the LEDs flash at the same time for 3 seconds, flash once from left to right, and turn on for 3 seconds before going out.



**Figure 2-13. Connecting the 38/6860 CCM for Charging and Communications**





## Connecting the CCM for Serial Communications

---

**Note:** Both the communications cables and the power supply connection are required for performing communications through the CCM.

---

1. Turn off the PC.
2. Plug the RS-232 null modem cable's DB-25 connector in the cradle's communication port.
3. Connect the cable's other connector to the host computer's serial (COMM) port.

## Daisy-Chaining Two or More CCMs

Up to twenty-four 38/6860 CCMs can be daisy-chained together for charging and communications. To daisy chain two or more groups of four CCMs requires:

- ♦ one 25-pin, male-to-female, straight-through RS-232 cable per group of coupled CCMs and
- ♦ one power supply per group of coupled CCMs.

Depending on how close together you place the CCMs, the cables can be from 1-foot to 10-feet long.

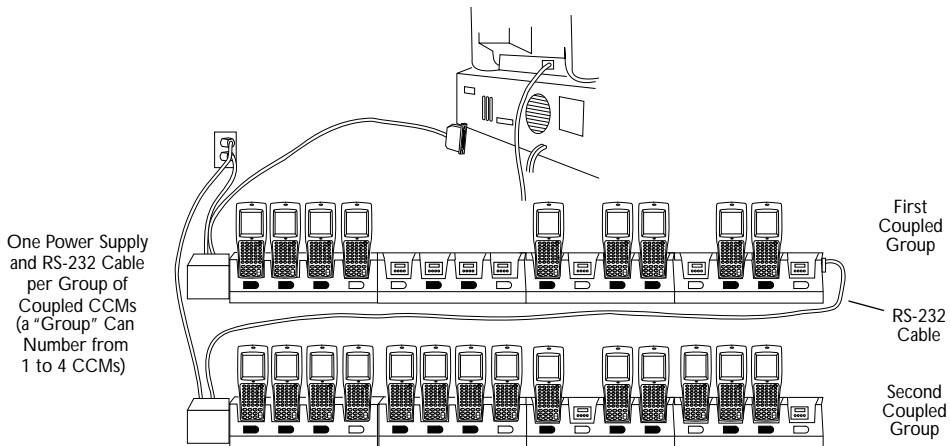


Figure 2-14. Daisy-Chaining Multiple 38/6860 CCMs

To chain the CCMs:

1. Couple the CCMs as directed in the section *Coupling CCMs*.
2. In the first coupled section, connect the serial cable to the left-most CCM.
3. Connect the RS-232 cable's (male or female) DB-25 connector in the serial port of the right-most CCM in the first coupling.
4. Connect the (male or female) DB-25 in the serial port of the left-most CCM in the second coupling.
5. Connect the power supplies for each coupled section as directed in *Connecting Power to the 38/6860 CCM*.



## The PC Adapter

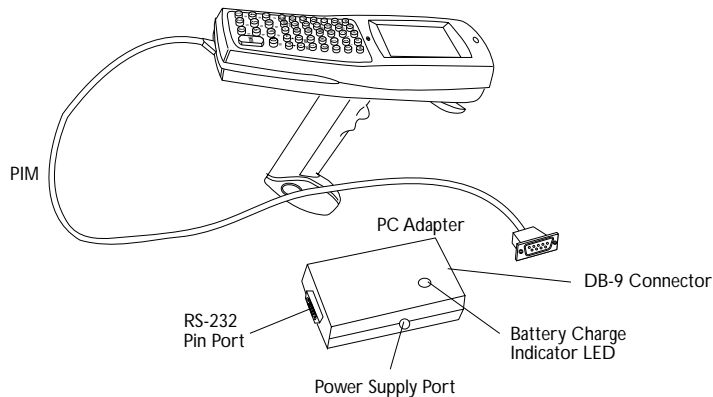
---

The PC Adapter works with the Printer Interface Module (PIM). With this arrangement, you can perform these tasks:

- ◆ Communicate to and from the PC without a 6860, 6865, or 6866 cradle
- ◆ Charge the NiCd battery pack in the terminal without a cradle.

### Parts of the PC Adapter

The parts of the PC adapter are shown in Figure 2-15 and described below.



**Figure 2-15. Parts of the PC Adapter**

- ◆ The Battery Charge Indicator LED flashes when the terminal power is turned on and while the terminal's NiCd battery pack is being charged.

---

**Note:** *When power to the PC Adapter is turned on, NiCd battery charging begins automatically and continues for 7 hours.*

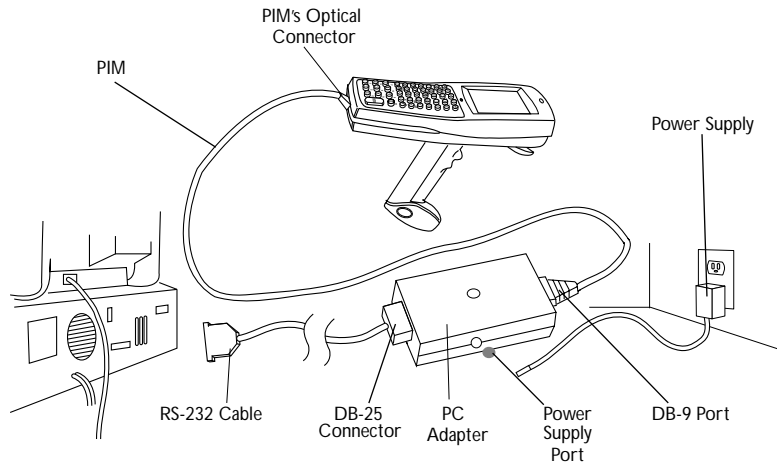
---

The LED flashes once when the terminal is turned on. It remains steady while the terminal is powered and blinks slowly during downloading.

- ◆ The RS-232 25-pin port is used to attach a null modem cable that connects to a PC or other RS-232 device. See *Appendix A* for null modem pin-outs.
- ◆ The DB-9 connector is used to attach the PIM's DB-9 connector.
- ◆ The power supply port is used to attach the 15-Volt power supply.

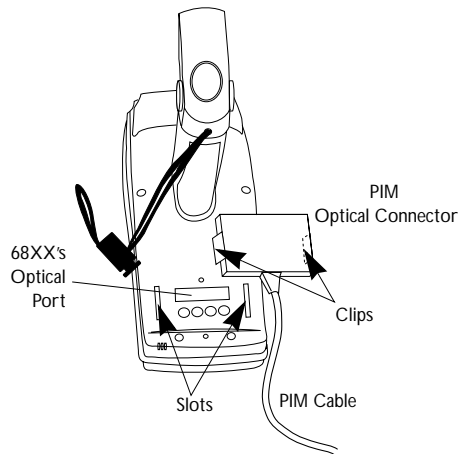
## Connecting the PC Adapter to 68XX and Serial Device

To set up the PC Adapter (refer to Figure 2-16):



**Figure 2-16. Setting Up the PC Adapter**

1. Turn the PC and terminal OFF.
2. Plug the PIM's DB-9 connector in the PC Adapter's DB-9 port.
3. Attach the PIM's optical connector to the 68XX's port by inserting the clips on the connector in the slots on either side of the port (see [Figure 2-17](#)).



**Figure 2-17. Attaching the PIM's Optical Connector**



4. Connect the RS-232 cable's DB-25 connector in the PC Adapter's RS-232 port.
5. Plug the other end of the RS-232 cable in the RS-232 device (e.g., host PC).
6. Plug the jack end of the 16-Volt power supply into the power supply port.
7. Plug the 15-Volt power supply's cube into an electrical outlet.

The Battery Charge Indicator LED flashes when the 68XX is powered on.



## *Chapter 3*

# *Batch and Spectrum One Terminal Setup*

## Introduction

---

Before using a Series 6800 terminal, perform the following procedures:

- ◆ Install the battery (refer to [Chapter 6, Maintaining the Series 68XX](#))
- ◆ Charge the battery (refer to [Chapter 6, Maintaining the Series 68XX](#))
- ◆ Load the system files and application(s).

Programs are stored in the terminal's nonvolatile memory (NVM), also called the application EEPROM.

## Hardware Requirements

---

The following equipment is required to initialize a batch or a Spectrum One radio terminal:

- ◆ 6800 or 6810 terminal
- ◆ One or more 38/6860 or 38/6865 cradles, or 38/6866 CCM
- OR
- ◆ PC adapter with Printer Interface Module (PIM)
- ◆ A straight-through RS-232 null modem cable with male DB-25 connector at one end and female DB-25 connector at the other end
- ◆ Power Supply
- ◆ Host Computer



Refer to Chapter 2, *Hardware Setup*, for instructions on setting up the cradles or PC Adapter for communications.

## **Communications**

For terminals being used in a direct communications (batch) environment or a Spectrum One network environment, applications are transferred from a host computer to the terminal:

- ◆ over a communications line using a null modem connected to the cradle  
OR
- ◆ through the PC Adapter.

The procedure uses the SENDHEX command on the host computer and the Program Loader function (from Command Mode) on the terminal.

---

**Note:** *For details on the SENDHEX command, refer to the Series 3000 Application Programmer's Manual.*

---

Other software may be used in place of SENDHEX.

## Loading the Program

---

To download the program, initiate the communications software on the host computer and terminal as described in the following sections.

---

**Note:** *Communications parameters specified on the host and the terminal must match. These parameters typically are:*

38400 bps  
7-bit parity  
Odd parity  
Xon/Xoff flow control

To program the EEPROM, the terminal must be connected to the host through a cradle, 6860 CCM, or PC Adapter with PIM.

---

## Initiate Host Communications Software

---

**Note:** *To cancel communications at any time during the session, press CLEAR on the terminal. The session stops immediately.*

---

1. Power on the host computer.
2. Start the communications program.
3. Enter the SENDHEX command.

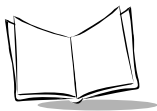
```
sendhex pgmname 38400 com2
```

where:

SENDHEX	is the command
pgmname	is the application being loaded (.hex extension is optional)
parameters	Communications parameters follow the program name. Parameters include baud rate, communications port, data bits, parity, and flow control. To accept the default parameters, do not enter a value.

In the example, the baud rate is set to 38400 bps and the communications port to COM2. The default values are accepted for the remaining parameters.





---

**Note:** *Versions of SENDHEX earlier than 3.0 do not support flow control. If you use an earlier version and encounter communication errors, use a lower baud rate.*

---

4. SENDHEX displays the prompt:

Press <Enter> to begin communications.

5. Do NOT press <ENTER> yet. Before starting communications (refer to [Starting Communications](#)), set up the terminal as directed in *Initiate Terminal Communications*.

## Initiate Terminal Communications

1. Boot the terminal to command mode. Refer to [Chapter 5, Operating the Series 68XX](#), for a list of the boot to command mode sequences.

The terminal displays the following:

COMMAND MODE

Select function

Self test

2. Scroll through Command Mode options using **UpArrow** or **DownArrow** until "Program loader" is displayed. Press <ENTER>.
3. The terminal displays:

Program loader

WARNING: EEPROM

WILL BE ERASED

CONTINUE? <ENT>

Before loading the new application, erase the NVM's original contents.

---

**Note:** *To cancel this operation, press <CLEAR>.*

---

4. Press <ENTER> to erase the EEPROM.

Wait while the EEPROM is erased. When complete, the program prompts for the communications parameters.

5. **Baud Rate.** The terminal displays:

Comm Parameters

Baud

4 9600

Scroll through the list using **UpArrow** or **DownArrow**. When the correct rate is displayed (38400 is recommended), press <ENTER>.

6. **Data Bits.** The terminal displays:

Comm Parameters

Data Bits

7

Press <7> (recommended) or <8> to specify data bits, or scroll through the list using **UpArrow** and **DownArrow**. Press <ENTER> when the correct value is displayed.

---

**Note:** *If 8 data bits is selected, the program selects "No parity" and skips the next step.*

---

7. **Parity.** If 7 data bits is selected, the terminal displays:

Comm Parameters

Parity

Odd

Press the first letter of a parity option (**E**ven, **O**dd, **N**one, **S**pace, or **M**ark), or scroll using **UpArrow** and **DownArrow** and press <ENTER> when the correct value is displayed.

8. **Flow Control.** The terminal displays:

Comm Parameters

Flow Control

None

Press the first letter of a flow control option (**N**one, **X**on/**X**off, or **R**TS/**C**TS), or scroll using **UpArrow** or **DownArrow** and press <ENTER> when the correct value is displayed.



## Starting Communications

1. The terminal is ready to receive the program from the host PC and displays:

Comm Parameters

Start? <ENT>

2. Press <ENTER> on the terminal.
3. Press <ENTER> on the host computer. **SENDHEX** begins transmitting the program image. When communications are established, the terminal displays:

Program loader

Receiving: XXXX

During program loading, the display shows the program segment address being transferred (XXXX).

4. When the transmission is complete, the terminal displays:

Program loader

Status 0000

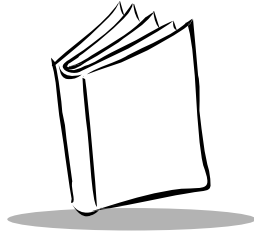
A status of 0000 (all zeros) indicates a successful transfer. Other status values indicate an error. These values are provided in [Appendix B, Communications Status Codes](#).

If you received an error, press <Clear> on the terminal to return to the Command Mode main menu.

## Ending Communications

To return to the Command Mode main menu:

1. Press <Clear> on the terminal.
2. Power down the terminal.
3. Detach any cables connected to the terminal.
4. Reboot the terminal using the appropriate cold boot sequence described in [Chapter 5, Operating the Series 68XX](#), in the section *Booting a Series 68XX*.



## Chapter 4

# *Spectrum24 RF Terminal Setup*

### Spectrum24 Terminals

---

In Spectrum24 terminals, wireless connectivity is accomplished using standard communications protocols. Because they are standard, the protocols are generalized and take up considerably more space on the terminal's NVM than is required for Spectrum One<sup>®</sup> terminals. Because there is less space available in NVM for application files, the terminal operates with an additional megabyte of non-volatile memory or *flash disk*. This extra memory is used to reduce not only the boot times but also the time and resources required to load applications into the terminal. The flash disk also offers the possibility of running multiple applications from the same terminal (refer to the section [Multiple Applications on the Same Terminal](#) for more information). With version 3.03 or later of the system software (LWP.HEX), the terminal can also run diagnostic tools.

### **Accessing the Flash Disk**

The flash disk is accessed through a driver, FLASHDSK.SYS, which makes the flash disk appear to a program as another disk drive (E:). The drive has characteristics of fast reading but slow writing (e.g., even for the smallest files, the write process takes 3-4 seconds). These characteristics make it ideal for files that are written once, accessed often, and seldom updated.

We recommend that you use the flash disk (E:) mainly for application and configuration file storage. It is important to note that because of the slow writing time (3-4 seconds), writing files during a power interruption (low battery, dead battery, suspend, power off, or power failure) could corrupt the disk. Be sure to only write data to the disk with the terminal connected to external power or with the battery fully charged to avoid problems. To avoid overwriting the flash disk by mistake, the flash disk is set to read-only mode for normal operation.



## Standard Spectrum24 Software

---

The 6840 comes with the system software installed, including:

- ◆ Spectrum24 radio drivers
- ◆ TCP/IP software
- ◆ configuration files
- ◆ various utilities.

A BIOS of version 3.08 or later is required.

The default files cover most expected installations/initializations with minor changes as detailed in this chapter.

If your requirements are more advanced, refer to the *SLASAP.COM* documentation for more information on the Spectrum24 RF network, SLAODI.COM, the Symbol-provided ODI driver, and the configuration file setups required for various platforms.

## Boot Options & Internet Addressing

---

Each 6840 requires a unique internet address (IP address), allowing messages it sends and receives to be correctly routed over networks conforming to the TCP/IP protocol standards. These addresses can be administered and entered manually, or administered and allocated by a server on the network.

By default, the 6840 uses NOBOOT (manual entry) to define the IP address. To set the IP address, use the CFG24 utility described later in this chapter in the section [Initializing the Series](#).

Two protocols are defined for the IP address allocation on the network: BOOTP and DHCP. To allocate IP addresses through a BOOTP or DHCP server, you must change the boot option in the configurator using the Boot Mode parameter.

## Initializing the Series

---

To initialize a 6840 which has *LWP.HEX* version 3.03 or greater loaded:

---

**Note:** *This section covers specific settings required on first booting the 6840 out of the box. For a complete review of the CFG24 screens, refer to Appendix E, Spectrum24 Utilities.*

---

1. Insert a charged battery in the 6840. Refer to Chapter 6 for instructions on charging and installing a battery.
2. Cold boot the 6840.

For the 46-key 6840:

- ♦ Press and hold <A + B + D>.
- ♦ Press and release **PWR**.
- ♦ Release <A + B + D>.

3. The 6840 loads software, then brings up the Spectrum24 Configurator (CFG24) menu, shown in [Figure 4-1](#).
- 

**Note:** *CFG24 comes up automatically after the first initialization out of the box. On subsequent initializations, type CFG24 at the DOS prompt to bring up the configurator.*

---

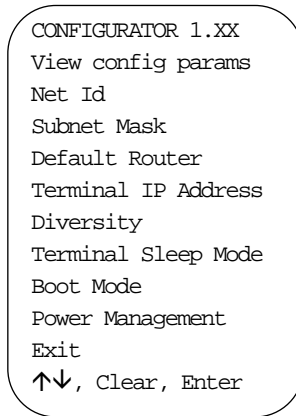
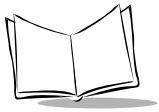


Figure 4-1. CFG24 Main Menu

On the 6840 screen, the top and bottom lines of the menu are displayed, and the remaining lines are viewed by scrolling. In this menu, pressing <CLEAR> has the same effect as selecting *Exit*.

4. The 6840 initially is set to NOBOOT mode. To configure the terminal for operation, set up the parameters provided in [Table 4-1](#) (the procedures are detailed in the steps below).

Table 4-1. Spectrum24 Configuration Parameters

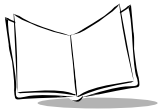
<b>Net Id</b>	The Net Id identifies the radio network and differentiates between different radio networks. All equipment on one network must use the same Net Id. Set to the same value specified for the Spectrum24 Access Points (APs).
<b>Boot Mode</b>	The boot mode indicates the source of the terminal's IP address. If this value is set to "Manual entry", you must enter a terminal IP address through CFG24.

Table 4-1. Spectrum24 Configuration Parameters (Continued)

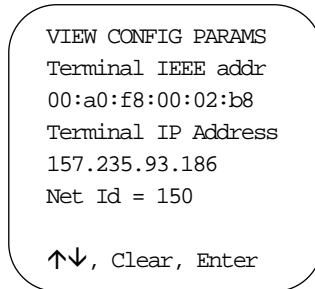
<b>Terminal IP Address</b>	<p>Required if you are not using a boot server to allocate IP addresses (BOOTP or DHCP).</p> <p>Set as advised by your LAN administrator.</p> <p><b>Note:</b> Take care entering this value! The IP address must be unique in the network or communications will be unpredictable.</p>
<b>Subnet Mask</b>	<p>Set as advised by your LAN administrator.</p> <p><b>Note:</b> If you change boot mode, the value set by a server overrides this value.</p>
<b>Default Router</b>	<p>The default router is the address of the node where all packets destined for remote networks will be sent.</p> <p>Set as advised by your LAN administrator.</p> <p><b>Note:</b> If you change boot mode, the value set by a server overrides this value.</p>
<b>Diversity</b>	<p>Determines whether the radio firmware attempts to use one or two antenna ports for communications. It is important to match this setting with the actual number of antennas in use.</p> <p>If set to “Yes”, the radio firmware attempts to use both antenna ports for communications.</p> <p>The 6840 has one antenna. Set to “No”.</p>
<b>Terminal Sleep Mode</b>	<p>Determines whether radio is powered off after the terminal enters sleep mode due to inactivity. Refer to Appendix E for more information.</p> <p>The default value is “On”.</p>
<b>Power Management</b>	<p>If power management is set to PSP, the radio powers up only when there is traffic on the network. If it is set to CAM, the radio is always ready to receive. Use the PSP setting to save battery life.</p> <p>The default value is “PSP”.</p>

- a. To view the 6840's default parameters, select VIEW CONFIG PARAMS (Figure 4-2).



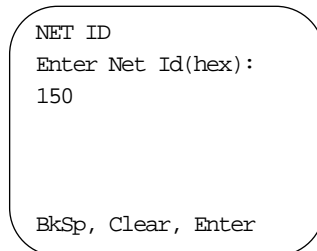


This screen is for display only; it is not a data entry screen. Use it to review the terminal's IEEE (or MAC) address, IP address, and Net Id. Press **<CLEAR>** or **<ENTER>** to return to the main menu.



**Figure 4-2. View Configuration Parameters Screen**

- b. To change the Net Id, select **Net Id** from the CFG24 Menu. The *Net Id* screen (Figure 4-3) is displayed.

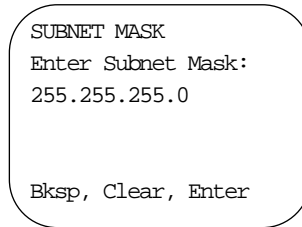


**Figure 4-3. Net Id Screen**

To change the current Net Id value, backspace over the current value and type a new value, in hexadecimal format, in the range 101 to 1FE. Alphabetical hex values can appear in upper or lower case. The default value is 101.

Press **<ENTER>** to effect the change. Press **<CLEAR>** to exit without changes.

- c. Select **Subnet Mask** from the main configuration menu. The *Subnet Mask* screen (Figure 4-4) is displayed.



```
SUBNET MASK
Enter Subnet Mask:
255.255.255.0

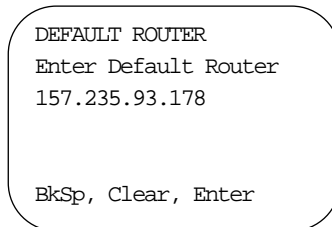
Bksp, Clear, Enter
```

**Figure 4-4. Subnet Mask Screen**

To change the current Subnet Mask setting, backspace over the current value and type a new value, in decimal form. Each part of the four-part address must be in the range 0 to 255. The default value is 255.0.0.0.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.

- d. Select **Default Router** from the main configuration menu. The *Default Router* screen (Figure 4-5) is displayed.



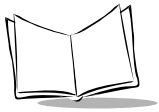
```
DEFAULT ROUTER
Enter Default Router
157.235.93.178

BkSp, Clear, Enter
```

**Figure 4-5. Default Router Screen**

To change the current Default Router setting, backspace over the current value and type a new value, in decimal form. Each part of the four-part address must be in the range 0 to 255. The default value is 0.0.0.0.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.



- e. Select **Terminal IP Address** from the main configuration menu. The *Terminal IP Address* screen (Figure 4-6) is displayed.

```

TERMINAL IP ADDRESS
Enter IP address:
157.235.93.186

BkSp, Clear, Enter

```

Figure 4-6. Terminal IP Address Screen

To change the current Terminal IP Address, backspace over the current value and type a new value in decimal form. Each part of the four-part address must be in the range 0 to 255. The default value is 0.0.0.0.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.

- f. Select **Diversity** from the main configuration menu. The *Diversity* screen (Figure 4-7) is displayed.

```

DIVERSITY
2 antennas (Yes/No)
Yes

↑↓, Clear, Enter

```

Figure 4-7. Diversity Screen

To change the current Diversity setting, use the ↑↓ cursor keys to toggle between the settings “Yes” and “No”. For the 6840, set Diversity to “Yes”.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.

- g. Select **Terminal Sleep Mode** from the main configuration menu. The *Terminal Sleep Mode* screen (Figure 4-8) is displayed.

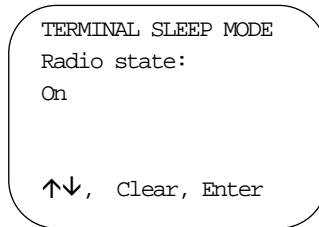


Figure 4-8. Terminal Sleep Mode Screen

To change the current Terminal Sleep Mode, use the ↑↓ cursor keys to toggle between the “On” and “Off” settings. The default setting is “On”.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.

- h. Select **Boot Mode** from the main configuration menu. The *Boot Mode* screen (Figure 4-9) is displayed.

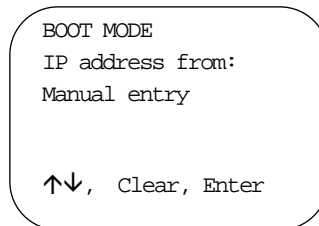
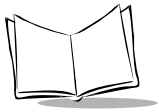


Figure 4-9. Boot Mode Screen

To change the current boot mode, use the ↑↓ keys to toggle among the three settings: “Manual entry”, “BOOTP”, and “DHCP”. Refer to Appendix E for a complete explanation of the three boot modes.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.



- i. Select **Power Management** from the main configuration menu. The *Power Management* screen (Figure 4-10) is displayed.

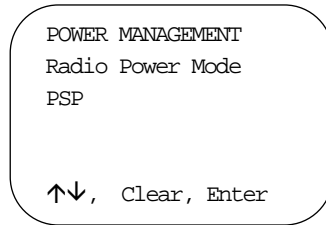


Figure 4-10. Power Management Screen

To change the current power management mode, use the  $\uparrow\downarrow$  keys to toggle between the settings “PSP” and “CAM”. The default setting is “PSP”.

Press **<ENTER>** to effect the change. Press **<CLEAR>** to exit without changes.

5. When all of your changes are made, press **<CLEAR>** to return to the main configuration menu.
6. Select *Exit* from the main configuration menu and press **<ENTER>** to exit the configurator.

The 6840 displays the message:

...updating config data

and proceeds with the initialization which writes the configuration values to a R/W non-volatile section of radio flash memory.

## Initiating Network Connection

As the initialization continues, the terminal attempts to associate with the Spectrum24 AP using the default or newly entered Net Id.

### Series 684X Association with AP Not Successful

If the 6840 is unable to associate with the AP (the Net Id is wrong or forgotten), it displays the message:

```
STAT24 Ver 1.XX  
NOT Associated
```

for a few seconds. A second message follows:

```
Terminal cannot associate with AP. You're  
out of range or not configured. Ctrl+C to end  
or other key to retry. Strike any key when  
ready.....
```

The 6840 continues trying to connect until the attempt is cancelled.

1. Press **<Ctrl + C>** to end the attempt. The 6840 displays the message:

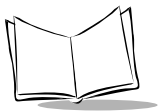
```
Halt Batch process Y/N?
```

2. Type **Y** to exit to the DOS prompt (D:).
3. At the DOS prompt, type **CFG24** and press **<ENTER>** to initiate the Configurator and bring up the Configurator screen.
4. Verify the Net Id with the LAN administrator to ensure you are entering the correct value.
5. Verify other parameters and proceed as directed in the section [Initializing the Series](#), beginning with step 4a.

### Series 684X Association with AP Successful

If the association is successful, the terminal begins operating using the software files loaded on the flash disk.

On first initialization, you probably don't have applications loaded. Proceed with loading the applications as directed in [Installing Application Software on Flash Disk](#). On subsequent initializations, if only one application is loaded, that application is displayed automatically. If you loaded multiple applications, an application selection menu is displayed early in the initialization process. Select the application to load for the current session and proceed.



## Installing Application Software on Flash Disk

---

---

**Note:** *LWP.HEX version 3.03 or greater is required on the 6840 for this process. If you are not sure of the terminal's hex version, boot (initialize) the 6840. The hex version is displayed for approximately 5 seconds during the initialization process.*

---

Installing application software on the 6840 flash disk includes downloading a HEX file to the 6840, using **SENDHEX** on the PC and a batch file (\_L.BAT) that runs **Program Loader** on the terminal, then re-initializing the terminal. On the initial boot after a software download, the 6840 copies the software files on to the flash disk, and remembers that the copy occurred, ensuring that it is not repeated each time the WWC is booted.

The hardware required for performing the download includes:

- ◆ 6840 terminal
- ◆ configuration cradle (38/6860, 38/6865, or 38/6866)
- ◆ DOS PC
- ◆ RS-232 serial null modem cable

### *Initiate Host Communications on the PC*

To update the hex image:

1. Power on the host computer.
2. On the PC, change to the directory where the application's hex file is stored and type the following command at a DOS prompt:

```
SENDHEX <file name> 384 [1|2]<ENTER>
```

where:

- SENDHEX is the command
- <file name> is the hex file for the application being loaded. There may be other application hex files which load other software (e.g., STEP version 2.6.0 or greater, or TelNet Clients 3.0 or greater) to the flash disk.  
**Note:** Be sure to use applications that are flash-disk enabled.
- 38400 is the baud rate.
- [1|2] sets the host communications port the cradle is attached to.

The following message is displayed:

Press <ENTER> when remote is ready. ESC to abort...

3. Do NOT press <ENTER> yet. Set up the 6840 using the \_L.BAT utility as directed in the section [Running \\_L.BAT](#).

## Running \_L.BAT

1. Place the 6840 in a configuration cradle.
2. Power the terminal on.
3. At a DOS prompt on the 6840, type \_L<ENTER> using the keystrokes listed below.  
For the 46-key 6840:

<SHF><FUNC><G><L><ENTER>

4. The terminal boots and displays the message:

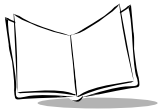
Symbol Technologies  
NVM Loader 2.X-XX

Connecting to Host

5. Press <ENTER> on the host PC.
6. The batch file runs Program Loader with the communications parameters set to 38,400 bps, 7 data bits, odd parity, and no flow control. The 6840 displays the screen:

Symbol Technologies  
NVM Loader 2.09-XX





Address: XXXX

7. When the hex download is complete, the 6840 automatically reinitializes (warm boots) and copies the files in the software package to the flash disk. If the 6840 does not reinitialize, re-initialize the 6840 using the following key sequence:

---

**Note:** *The 6840 must be re-initialized to copy the software to the flash disk.*

---

For the 46-key 6840:

- ♦ Press and hold the **4** and **5** keys.
- ♦ Press and release **PWR**.
- ♦ Release the **4** and **5** keys.

---

**Note:** *If you get a timeout message at any time during the procedure, press <ENTER> to return to the screen.*

---

8. The software is copied on to the flash disk.
9. Proceed with initializing the network connection as described in the section [Initiating Network Connection](#).

---

**Note:** *If you downloaded multiple applications, a “select” screen appears before the 6840 attempts to associate with an AP, requesting that you select an application.*

---

## Updating System Software on Flash Disk

---

Updating the LWP hex image means loading the new system files on the flash disk using the SENDHEX utility on a PC. It is possible to perform this update on multiple terminals in a cradle at one time, with each terminal running Program Loader from Command Mode.

---

**Note:** *The 6840 is shipped with the LWP hex file installed. Use this procedure ONLY:*

- *to load a new version of LWP greater than 3.03*
  - *if you experience serious difficulties*
  - *if you are so directed by Symbol's Technical Support staff.*
- 

### Option: Using \_L.BAT to Update System Software

If the 6840 terminal contains a LWP hex file of version 3.03, you can follow the instructions for installing application software on the flash disk using \_L.BAT through step 6, when the terminal is reinitialized. Proceed to step 6 of this procedure at that point.

---

**Note:** *Be sure, when entering the SENDHEX command on the PC, to issue the command from the directory where the hex file (LWP.HEX) is stored.*

---

## Initiate Host Communications on the PC

To update the system software:

1. Power on the host computer.
2. On the PC, change to the directory where the system hex file (LWP.HEX) is stored and type the following command at a DOS prompt:

```
SENDHEX LWP 384 [1|2] <ENTER>
```



where:

- SENDHEX is the command.
- LWP is the hex file being loaded. LWP.HEX is the hex file specifically for the system files. There may be other hex files which load other software, such as applications, to the flash disk.
- 384 is the baud rate (38,400 bps).
- [1|2] sets the host's communication port the cradle is connected to.

The following message is displayed:

Press <ENTER> when remote is ready. ESC to abort...

3. Do NOT press <ENTER> yet. Set up the terminal as described in [Initiate Terminal Communications](#).

## Initiate Terminal Communications

1. Power off the 6840 and place it in the cradle.
2. Boot the 6840 to Command Mode.

For the 46-key 6840:

- ♦ Press and hold <F + I>.
- ♦ Press and release **PWR**.
- ♦ Release <F + I>.

The terminal displays the function selector screen:

COMMAND MODE

Select function

Self Test

3. Scroll through the Command Mode options using ↑ or ↓ until “Program loader” is displayed. Press <ENTER>.

- The 6840 displays:

```

Program loader
WARNING: EEPROM WILL
BE ERASED
CONTINUE?

<ENT>

```

---

**Note:** *To cancel this operation, press <CLEAR>.*

---

- Press <ENTER> to erase the EEPROM.  
Wait while the EEPROM is erased. When complete, the program prompts for the communications parameters.
- Set the parameters to 38,400 bps, 7 data bits, odd parity, and no flow control. Press <ENTER>.

## Start Communications

- The 6840 displays:

```

Comm Parameters

Start? <ENT>

```

- Press <ENTER> on the 6840.
- The 6840 displays:

```

Comm Parameters

Receiving: XXXX

```

If the host is not ready or if the cable is not connected properly between the host PC and the cradle, the 6840 displays:

```

Awaiting DSR

```

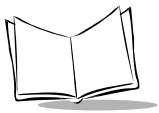
- Press <ENTER> on the host PC to start the download. The 6840 displays:

```

Program loader

Status XXXX

```



5. When the transmission is complete, the 6840 displays:

Program loader

Status 0000

A status of 0000 (all zeroes) indicates a successful transfer. If the status is other than 0000, check the cable connections between the host PC and the cradle and repeat the process. If the problem persists, contact the Symbol Support Center for assistance.

6. When the download is complete, the 6840 displays the following query:

LWP.HEX Ver X.XX

Loading system files

1. Reformat flash

2. Use flash as-is

Select [1,2]:

### ***Caution***

Reformatting the flash removes all system files and applications stored on the flash disk.

Select **1, Reformat flash**, ONLY if you have problems with the 6840's operation. Select **2, Use flash as-is**, to update the flash while retaining the existing contents.

7. If you select 1, the 6840 displays the message:

Are You sure Y or N

8. Press **Y** to continue with the reformat or **N** to cancel and press **<ENTER>**.

The 6840 finishes reformatting (if requested), copies the files to the flash disk, and executes them.

## Compatibility Issues When Updating

While the order in which software packages are loaded is not important, we recommend loading the system files, LWP.HEX, first, before loading any application files. You don't have to reload existing applications that conformed to previous standards for flash disk applications. Loading just the system files allows the old applications to run with updated system software.

---

**Note:** *Some configuration changes may be required.*

---

## Complications: Naming Applications

In versions of LWP.HEX for flash disk terminals prior to version 3.03, parameters were defined in NET.CFG to specify the applications that would run on the terminal. If only one application was used and no applications were defined in NET.CFG, the system gave the application the default name, *APP*. This can cause problems if you plan to add more applications to terminals using version 3.03 HEX files.

With LWP.HEX 3.03, the application entries in NET.CFG are not longer required. The system now decides which applications are installed on the terminal by scanning the flash disk's directories and files. If you had an original application with the default name *APP*, it will show up in the application selection menu as *APP*. If you updated that old application (e.g., created a version 3.03 HEX file of the application), the application selection menu will contain both versions, one called *APP* and one by the "real" name (e.g., *STEP*).

Because of this potential problem, if ALL the software on the flash disk is being replaced in the update, we recommend reformatting the flash disk using *FLSHFMT*. Reformatting deletes ALL the files on the flash disk and eliminates this duplication.

---

**Note:** *DO NOT run the FLSHFMT utility unless all the HEX files, including LWP.HEX, are available to recreate the flash disk file system.*

---

## Complications: System Parameters

In flash disk terminals with a LWP.HEX version prior to 3.03, some system parameters were changeable only by editing NET.CFG (e.g., power management mode, boot mode, and diversity). These parameters were not saved in the radio flash.



When the LWP.HEX is updated to 3.03, these values revert to the defaults. Be sure to check them after LWP.HEX is installed. In particular, verify whether a BOOTP or DHCP server is being used to allocate IP addresses. The default boot mode in version 3.03 is manual entry of IP addresses. The terminal enters the configurator during the first terminal initialization after the LWP.HEX upgrade, allowing you to check the settings.

## **Multiple Applications on the Same Terminal**

The system files (from LWP.HEX) fill over 200 KB of the flash disk's 1 MB. Current standard applications such as STEP or TN clients require between 100 KB and 150 KB of flash disk. This leaves ample space for installing more than one application on a single 6840. Terminals have been configured to run as many as four applications, with a maximum of five applications allowed.

Individual applications may require special terminal configurations that can only be set at boot time, such as RAM disk size. The TN clients require configuring a minimum-size RAM disk (<100 KB) because their limiting resource is program execution space. STEP, on the other hand, uses the RAM disk to hold forms. Some STEP application implementations use forms extensively and require a larger RAM disk (>100 KB). The application loaded last defines the size of the RAM Disk for all applications on the flash disk.

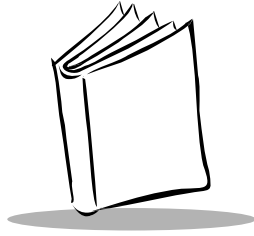
---

**Note:** *The system files contained in the LWP.HEX have the RAM disk defined as 80 KB.*

*It is possible with multiple applications to have applications co-existing on the terminal with conflicting memory requirements. If this occurs, work out a compromise value that both applications can work with before loading the files.*

---

If multiple applications are installed on the 6840, a menu is presented during the initialization process where you select the application to run for this session. Switching between applications requires re-initializing the terminal and selecting an alternative application when prompted. On warm boots, the terminal re-initializes and reenters the same application that was selected before the re-initialization. On cold boots, if there are multiple applications available, an application selection menu is presented.



## *Chapter 5*

# *Operating the Series 68XX*

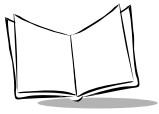
### **Overview**

---

This chapter describes how to operate a Series 68XX, including:

- ◆ Powering the 68XX on and off
- ◆ Booting the 68XX
- ◆ Adjusting the display contrast
- ◆ Entering data using the keyboard
- ◆ Entering data using the scanner
- ◆ Capturing signatures
- ◆ Communicating with a PC or printer
- ◆ Communicating on an RF network.





## Normal Power On Techniques

---

There are several ways to power on a terminal. Each way lets you resume at the same location in the application where you left off.

---

**Note:** *The Series 68XX terminals always check for enough battery power for safe operation before they power on.*

---

### **Removal From a Cradle**

The terminal automatically powers on when it is removed from a cradle. While the terminal is in the cradle, the battery is constantly being charged. If you remove the terminal from the cradle but do not use it right away, press the **PWR** key to turn it off, or let it power off automatically. Refer to the section *Restoring Power After Automatic Shutdown*.

### **Keyboard**

Your terminal can be programmed to power on from the keyboard in one of two ways:

- ◆ Press the **PWR** key only.
- ◆ Press any key.
- ◆ If you press the **PWR** key while the terminal is in the cradle, the terminal powers on. If you leave the terminal in the cradle and press **PWR** to turn the terminal off, it appears to turn off; however, the terminal is on very low power.

See the your application guide or the *Series 3000 Application Programmer's Guide* for more information.

### **Real-Time Clock**

If the application program allows it, the terminal can be powered on by the real-time clock. This lets the terminal perform unattended operations, such as an overnight communication session.

### **Laser Trigger**

If the application program allows, you can power on the terminal by pulling the laser trigger.

## Restoring Power After Automatic Shutdown

The terminal shuts off if you don't use it for an amount of time set by your application. Press the **PWR** key or press the trigger to restore power and return to your application.

## Power Off

---

To perform a normal power off, press the **PWR** key or let the terminal shut down automatically as programmed. See your application guide or the section *Restoring Power After Automatic Shutdown* for more information. Consult your system administrator if you are unable to power off the terminal.

## Forced Power Off

If pressing the **PWR** key does not turn off the terminal, force the power off to reduce battery drain and preserve your data.

To force power off, press and hold the **PWR** key for 15 seconds, until the terminal powers down.

## Restarting After a Forced Power Off

When a terminal is powered off because of software or hardware failure, use the following methods to restart:

- ◆ Use the warm-boot procedure for a software failure.
- ◆ When a warm boot fails, use the cold-boot procedure.
- ◆ If a system software problem in the nonvolatile memory (NVM) occurs, see [Chapter 3, Batch and Spectrum One Terminal Setup](#).

---

**Note:** *Do not use the **PWR** key to restart a terminal when it was forced off due to defective system or application software in the NVM. Pressing the **PWR** key causes the program to resume where it stopped, trying to perform the same unsuccessful operation.*

---



## Booting a Series 68XX

---

### **Warm Boot**

A warm boot resets the operating system while preserving the RAM disk.

To perform a warm boot:

1. Power off the Series 68XX.
2. Press and hold the **4** and **5** keys.
3. Press and release the **PWR** key.
4. Release the **4** and **5** keys.

The terminal displays configuration information, copyright, RAM size, and expanded memory RAM size. Other information displayed depends on the operating system, installed device drivers, and AUTOEXEC.BAT commands. If this warm-boot procedure fails to restart the terminal, use the cold-boot procedure.

### **Cold Boot**

A cold boot resets the BIOS and operating system; it erases and recreates the RAM disk. If the cold-boot procedure fails to restart the terminal, see [Chapter 7, Error Recovery and Troubleshooting](#).

### **Caution**

This procedure permanently erases all data and software in the terminal unless they reside in NVM. Contents of RAM are lost.

To perform a system cold boot:

1. Power off the Series 68XX.
2. Press and hold the **A**, **B**, and **D** keys.
3. Press and release the **PWR** key.
4. Release the **A**, **B**, and **D** keys.

The terminal displays version information, copyright, RAM size, and installed expanded memory RAM size. Other information displayed depends on the operating system, installed device drivers, and AUTOEXEC.BAT commands.

## Cold-Boot Failure

During a cold boot, the system briefly displays a status line for each driver as it loads in the format:

```
0: Driver  #.##
```

The line shows a status value, usually 0, followed by the name and version number of the driver. If the system halts at one of these lines and displays a status value other than 0, the displayed device driver failed to load properly.

If such a failure occurs, try cold booting the terminal again. If this does not solve the problem, call the Symbol Support Center.

More troubleshooting information is provided in the publications listed in *Related Documentation* at the beginning of this manual.

## Boot to Command Mode

Command Mode provides functions for:

- ◆ Running the Self-Test program to verify that the hardware is operating properly (refer to [Chapter 7, Error Recovery and Troubleshooting](#)).
- ◆ Performing a Memory Transfer to upload data from a terminal to a host system (refer to [Chapter 7, Error Recovery and Troubleshooting](#)).
- ◆ Performing a Program Download to transfer an application from the host to a terminal (refer to [Chapter 3, Batch and Spectrum One Terminal Setup](#)).

To boot to Command Mode:

1. Power the Series 68XX off.
2. Press and hold down the **F** and **I** keys.
3. Press and release the **PWR** key.
4. Release the **F** and **I** keys.



## Adjusting the Screen Contrast

---

### *Display Contrast*

The screen's contrast is adjustable to eight levels, making the display more readable in different lighting conditions, and at various temperatures.

- ◆ To reduce (lighten) display contrast, press **FUNC X**.
- ◆ To increase (darken) display contrast, press **FUNC Y**.

### *Back Lighting*

The backlight illuminates the display in dimly lit areas.

To turn the back light on or off, press **FUNC** then **L**, or use the key sequence listed in your application guide. The back light turns off automatically when the terminal is powered off or when the terminal has not been used for an amount of time set by the application. See the application guide for more information.

## Entering Data

---

### *The Keyboard*

The keyboard is used for entering data and issuing commands to the terminal. The keys on the keyboard are distinguished as modifier keys and character keys. Because terminal keyboards have fewer keys than PC keyboards, each character key can produce more than the usual one or two characters. The modifier keys, SHF (Shift), CTL, and FUNC, used individually or in combination, determine which character or special function the character keys produce.

Because the keyboard is programmable, your terminal may not work as described here. For more information and illustrations of other keyboard states, see the *Series 3000 Application Programmer's Guide* and your application guide.

### *Using the Keyboard*

Except for during boot operations, the terminal expects the operator to press keys one at a time. If the terminal has been programmed for it (ERR3000 is loaded), and if two or more keys are pressed simultaneously, the terminal indicates a Double-Key or Too Many Key error.

The keyboard also has an optionally configurable auto-repeat function. If the application allows, a character repeats as long as the key is held down. If the key is pressed immediately following a modifier key, the modifier sequence affects only the first occurrence of the character key.

## Modifier Keys

The Shift, Alpha, Function, and Control keys are modifier keys. When pressed individually or in certain combinations, these keys change the keyboard state and possibly the character produced by the character key subsequently pressed. Refer to [Table 5-1](#) for a list of the 68XX's special keys.

For example, pressing <**Func**> followed by <**Ctrl**> produces Alt characters, with the same effect as pressing the Alt key on a PC.

## Keyboard Speed

If your application program allows it, the characters may be set to appear faster or slower. Refer to the *Series 3000 Application Programmer's Manual* for more information.

## Keyboard States

The keyboard states are listed below, in the order in which they take priority:

- Unshifted
- Shifted
- Function
- Control

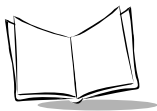
## Momentary and Locked States

Each keyboard state is either momentary or locked. A momentary state lasts for only the following keystroke. A locked state lasts until the activator key is pressed again.

Only one momentary state can be active at a time. Momentary states always take priority over locked states. If you press several momentary state keys in a row, the system changes to the state of the last key pressed. For example, if you press **SHF**, then **CTRL**, the terminal enters the CONTROL state.

The CTRL, SHF, and FUNC keys activate a momentary state. If you press a momentary state key twice in a row, the system enters the state and then cancels it. For example, if you press **SHF**, **SHF**, the terminal is shifted and then immediately unshifted.

When batteries are low, the cursor changes. See **Keyboard State Cursor Formats** in [Table 5-2](#).



When an operator ends a momentary state (by toggling it off or by completing the key sequence), the system returns the keyboard to the last active locked state.

---

**Note:** Pressing the **FUNC** key does not clear the last momentary state. However, pressing another momentary key after **FUNC** clears the **FUNCTION** state.

---

Table 5-1. Special Keys

Key Name	Description
<b>CTL</b> (Control)	Invokes the control command.
<b>FUNC</b> (Function)	Invokes the function command for certain utilities, such as turning on the back light. <ul style="list-style-type: none"><li>♦ Press <b>FUNC</b> and the corresponding numeric key to produce function keys F1 to F10.</li><li>♦ Press <b>FUNC</b>, then to scroll left and <b>FUNC</b> to scroll right.</li><li>♦ Press <b>FUNC</b> then <b>BKSP</b> to enter a blank space.</li></ul>
<b>BKSP</b> (Backspace)	Erases information entered on the display one character at a time. Information erased this way cannot be recovered. This key is also used to produce a break by pressing <b>CTL</b> , <b>BKSP</b> .
<b>PWR</b> (Power)	Turns the terminal on and off.
<b>CLR</b> (Clear)	Partially or completely escapes from an application level or screen. <b>CLR</b> also clears all data typed from the display.
<b>SHF</b> (Shift)	Accesses the shifted keyboard.
<b>ENTER</b>	Places entered data into the terminal's memory.
▲▼	Move the cursor up, down. Press <b>FUNC</b> then ▲ to scroll left; press <b>FUNC</b> then ▼ to scroll right. Arrow key use depends on the application.

## Keyboard Key Definitions

The standard tasks performed by the keys in their normal, unshifted state are shown in [Figure 5-1](#) and listed in [Table 5-1](#). For all other keyboard states, refer to Appendix B of the *Series 3000 Application Programmer's Reference Manual*.

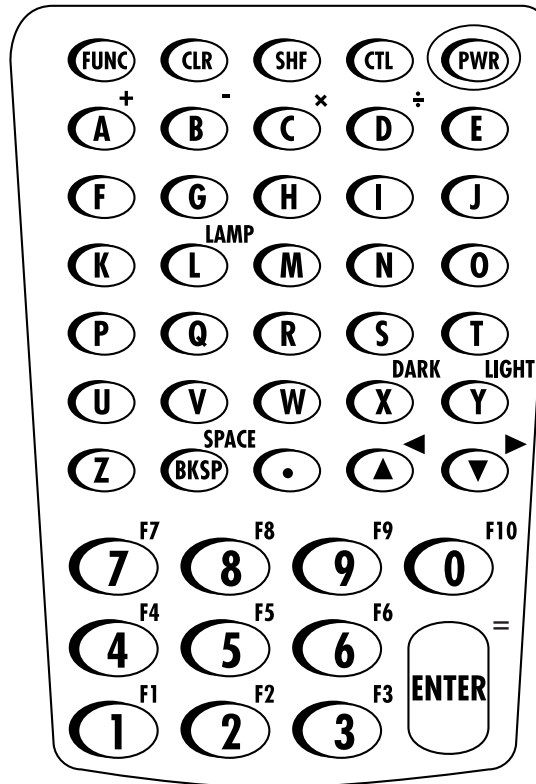
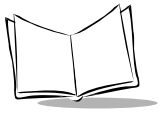












Figure 5-1. 46-Key Keyboard





**Table 5-2. Cursor Indicators**

<b>Keyboard State</b>	<b>Cursor Character</b>	<b>Low Battery</b>
Unshifted	 (inverted caret)	 (inverted solid caret)
Shifted	 (caret)	 (solid caret)
Momentary Shifted	 (up arrow)	 (solid up arrow)
Momentary Unshifted	 (down arrow)	 (solid down arrow)
Control	<b>C</b> (underline c)	 (inverse c)
Function	<b>f</b> (underlined f)	 (inverse f)

## Scanning

---

Before scanning can occur, the terminal must be running an application that supports bar code scanning. The terminal must also be programmed to scan the type of bar code you want, such as Universal Product Code (UPC) or Code 3 of 9. For information on scanning applications and on programming the scanner, refer to the *Series 3000 ADK*.

### Entering Data Using the Laser Scanner

1. Pull the trigger on the handle to power on the 68XX and laser scanner. The Scan LED turns red if scanning is enabled and the laser is on.
2. Point the 68XX at a slight angle to the bar code and pull the trigger.

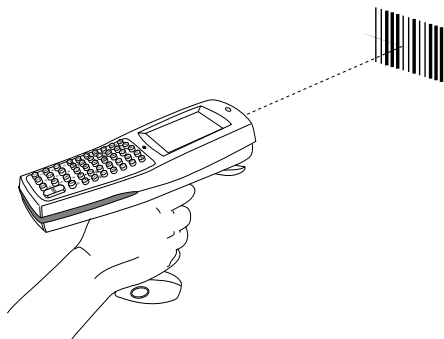


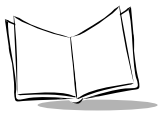
Figure 5-2. Scanning with the 68XX

3. Ensure that the scan beam crosses all bars and spaces on the bar code symbol, as shown below. Do not hold the scanner directly over the bar code.



Optimal scanning distance varies with bar code density and scanner optics, but more combinations work within 4 to 10 inches.

4. If the decode is successful, the screen displays the code and the Scan LED flashes red. The terminal may also beep.



---

**Note:** *The procedure for your scanner may differ from the one given above. Scanner use depends on the application.*

---

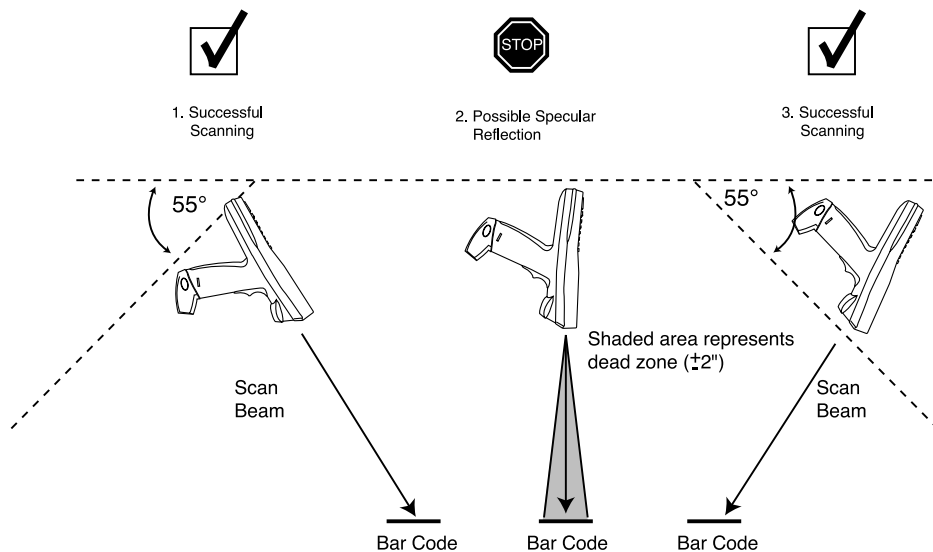
## Scanning Considerations

Usually, scanning is a simple matter of aim, scan, and decode, and a few quick trial efforts master it simply and intuitively. However, two important considerations can optimize any scanning technique — angle and range.

### Angle

Scanning angle is important for promoting quick decodes. When laser beams reflect *directly* back into the scanner from the bar code, this specular reflection can actually “blind” the scanner.

To avoid this, scan the bar code so that the beam does not bounce *directly* back. But don't scan at too oblique an angle; the scanner needs to collect scattered reflections from the scan to make a successful decode (refer to [Figure 5-3](#)). *Practice quickly shows what tolerances to work within.*



**Figure 5-3. Scanning Angle and Specular Reflection**

## **Range**

Any scanning device decodes well over a particular working range — minimum and maximum distances from the bar code. This range varies according to bar code density and scanning device optics.

Scanning within range brings quick and constant decodes; scanning too close or too far away prevents decodes. You need to find the right working range for the bar codes you are scanning. The best general advice is:

- ◆ Hold the scanner farther away for larger symbols.
- ◆ Hold the scanner closer for symbols with bars that are close together.
- ◆ Start scanning at a distance from the bar code, not from direct contact. If the bar code does not readily decode, move the scanner in closer.

Practice quickly shows what distances to work within.



## Communications

---

### With a Host

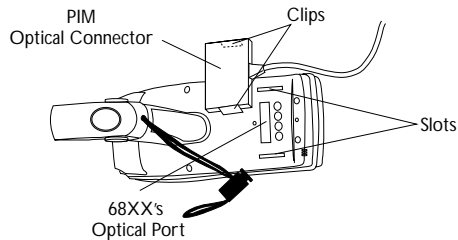
To communicate with a host:

1. Set up the 38/6860 CCM, 38/6865 cradle, 38/6866 cradle, or the PC adapter as described in Chapter 2, *Hardware Setup*.
2. If using a cradle, place the terminal in the CCM or cradle.
3. Start the communications program on the host and terminal.

### With a Printer

To communicate with a printer, attach the 68XX to the Printer Interface Module:

1. Attach the PIM's optical connector to the 68XX's port by inserting the clips on the connector in the slots on either side of the port.



**Figure 5-4. Connecting the 68XX and the PIM**

2. Plug the PIM's DB-9 connector in the printer's port.
3. Power the printer and 68XX on.

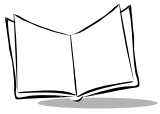
## RF Network Communications

The PDT 6810 operates in a Symbol Spectrum One<sup>®</sup> RF network; the 6840 operates in a Symbol Spectrum24<sup>®</sup> RF network.

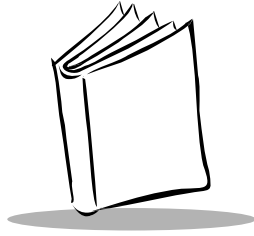
The terminal's Status LED indicates the state of the 6800's connection to either of the RF networks:

<b>Off</b>	indicates that the radio is working and associated with an access point (Spectrum24) or base station (Spectrum One). <i>Status LED indication of RF status presently not available</i>
<b>Flashes red once per second</b>	to indicate that the radio is out of range or not associated with an access point or base station. <i>Status LED indication of RF status presently not available.</i>

Refer to the network documentation for more information on operating the 68XX in the specific RF environment.



*Series 68XX Product Reference Guide*



## Chapter 6

# Maintaining the Series 68XX

### Batteries

---

The Series 68XX terminal is powered by a rechargeable nickel cadmium (NiCd) battery pack or one 9-volt alkaline battery installed in the alkaline battery adapter. Fully charged, the NiCd battery pack provides up to 8 hours of continuous operation.

The NiCd battery pack is recharged by:

- ◆ placing a 68XX with the battery installed in a 38/6860 CCM or in a 38/6865 or 38/6866 cradle for 7 hours, or
- ◆ by connecting the terminal to a PC Adapter, or
- ◆ by placing the battery pack in a spare battery charging slot on the 38/6860 or 38/6865 for up to 7 hours.

---

**Note:** *The terminal can be used while the battery is being charged in the 38/6860 CCM or connected to the PC Adapter.*

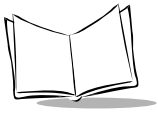
---

### Battery Life

Battery life is affected by many factors, including

- ◆ scanning
- ◆ radio communications
- ◆ very high or very low operating temperatures
- ◆ backlighting use
- ◆ battery age.















## When to Replace or Recharge the Battery

The Series 68XX terminals provide two types of indicators to notify you when battery power is running low: warning messages and modified cursors. These indicators may be changed or disabled by an application.

- ◆ **LOW BATTERY** - When the battery is low, the cursor changes as shown in [Table 6-1](#). If ERR300 is loaded, the message LOW BATTERY also appears. At this level the terminal continues to operate, but there is probably less than 1 hour of usable power left.
- ◆ **VERY LOW** - When the power is very low, the DEAD BATTERY message appears and the system powers off. Replace an alkaline battery or recharge a NiCd battery before attempting to use the terminal. If the battery is not immediately recharged or replaced, data may be lost.

**Table 6-1. Cursor Indicators**

Keyboard State	Cursor Character	Low Battery
Unshifted	 (inverted caret)	 (inverted solid caret)
Shifted	 (caret)	 (solid caret)
Momentary Shifted	 (up arrow)	 (solid up arrow)
Momentary Unshifted	 (down arrow)	 (solid down arrow)
Control	<b>C</b> (underline c)	 (inverse c)
Function	<b>f</b> (underlined f)	 (inverse f)

## Backup Batteries

To prevent data loss during battery replacement, the terminal utilizes a supercap as a backup. The supercap provides sufficient power to preserve memory contents for approximately 15 minutes while the primary battery is replaced. The supercap does not provide enough power to operate the terminal. On receiving a low battery message, replace or recharge the primary batteries immediately.

## NiCd Battery Pack

### Replacement Battery Packs

NiCd battery packs available from Symbol are listed below.

System	P/N	Battery Pack
Five-cell, 780 mAh	21-32801-01	NiCd rechargeable
Six-cell, 600 mAh IS		Intrinsically safe NiCd rechargeable battery pack

---

**Note:** *The Series 3800 NiCd battery packs, 3872-103, 3872-105, and 3872-115, cannot be used in the Series 6800 terminal.*

---

### Removing the NiCd Battery Pack

To remove the battery pack (refer to [Figure 6-1](#)):

1. Power the terminal off.
2. Press the battery release buttons on both sides of the handle ([Figure 6-1](#)).

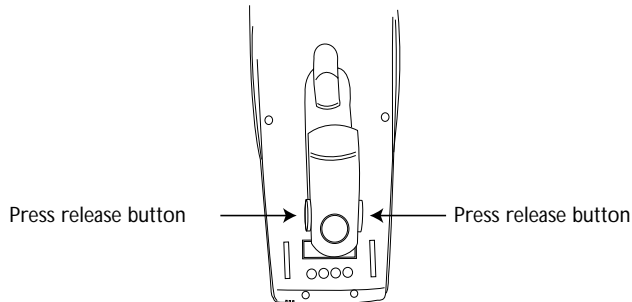
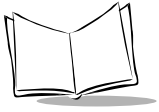
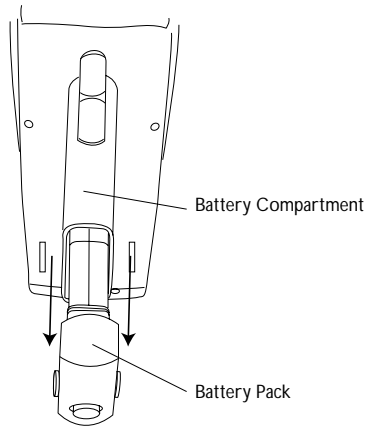


Figure 6-1. Releasing the Battery



3. Slide the battery pack out of the handle.



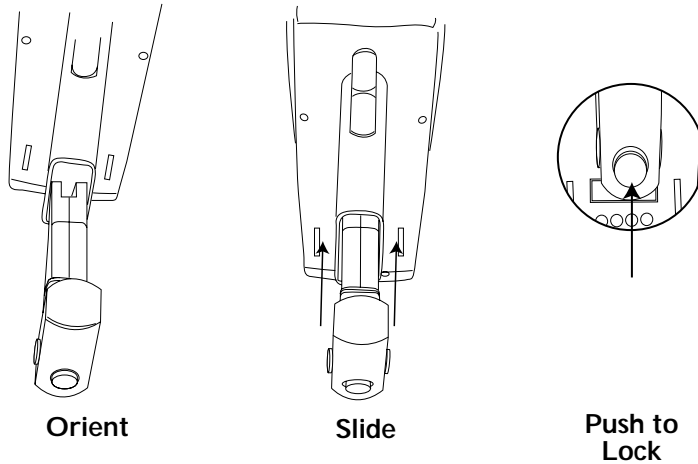
**Figure 6-2. Sliding Battery Pack Out of Battery Compartment**

### ***Caution***

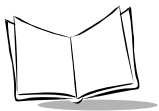
If you intend to store your terminal without the battery pack, ensure you have stored any data and/or programs you wish to keep on another terminal, a host computer, or another medium to avoid loss of data. The terminal backup power source retains data for approximately 15 minutes after the battery pack is removed, as long as the backup batteries remain in place.

## ***Installing the NiCd Battery Pack***

1. Orient the battery pack with the handle facing the 68XX's scan window.
2. Slide the pack into the battery compartment while pressing the battery release buttons.
3. Press the battery lock in to secure.



**Figure 6-3. Inserting the NiCd Battery Pack in the Battery Compartment**



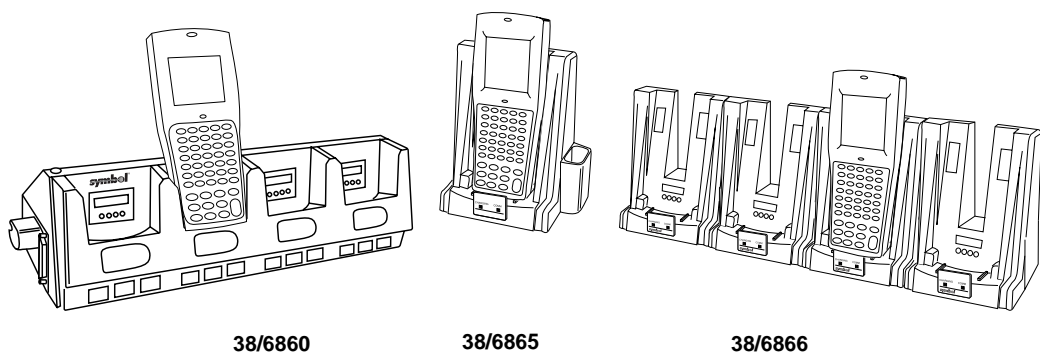
## Charging the NiCd Battery Pack

The NiCd battery pack automatically charges when the terminal is placed in a cradle or connected to a PC Adapter. A full charge takes about 7 hours. We recommend that you always keep the NiCd battery pack fully charged.

### Battery Charging in the Terminal Using a Cradle

To charge a NiCD battery in the terminal, using the 38/6860, 38/6865, or 38/6866 cradle ([Figure 6-4](#)):

1. Place the terminal in the cradle. The cradle charging light flashes when charging a discharged battery and remains steady when trickle-charging a charged battery.



**Figure 6-4. Charging the Battery in the Cradle**

2. Leave the terminal up to 7 hours to recharge a fully discharged battery.

## Charging Battery Packs Outside the Terminal

Slots are provided in 38/6860 and 38/6865 cradles to charge spare battery packs outside the terminal.

Place the battery pack to be charged in one of the battery slots in the cradle. The LED indicator lamp under the battery slot in which the terminal was placed indicates the battery is charging. (On the 38/6860 CCM, the spare-battery-charging indicator lamp is on the right.) If the lamp is off, charging is not occurring. A blinking LED indicates fast charge; a solid on LED means slow charge/ready. See the cradle documentation listed in *Related Publications* for details.

### ***Caution***

The optional communications cradles are NOT certified for use in potentially hazardous environments. To charge an intrinsically safe Series 68XX in a cradle, remove the terminal from the potentially hazardous environment before charging.

## Battery Charging with the PC Adapter

Refer to [Chapter 2, Hardware Setup](#), for instructions on setting up the PC Adapter for charging.

Battery charging begins automatically when power is supplied to the PC Adapter. Fully charging a battery using the PC Adapter requires 7 hours.

## Other Charging Options

You have the option of charging battery packs in the UBC 1000 or 2000 Charger. Refer to the documentation for the charger for more information.



## **Battery Charging Tips**

For maximum capacity and battery life, follow these helpful hints:

### **Do**

- ◆ Charge at temperatures between 0°C and 38°C (32°F to 100°F); 21°C (70°F) is preferred
- ◆ Recharge as soon as you see the “Low Battery” message
- ◆ Save your data and program on another terminal or another medium if you plan to store your terminal without the primary battery pack
- ◆ Store batteries at room temperature of 21°C (70°F) or cooler
- ◆ Recharge the NiCd battery pack after storage.

### **Don't**

- ◆ Store or recharge primary batteries at temperatures below 0°C (32°F) or above 38°C (100°F)
- ◆ Judge a battery's charge level by measuring its voltage; voltage does not indicate charge level.

## Cleaning

---

Series 68XX terminals require a minimum amount of maintenance, and proper use and care of the terminal will enable it to function accurately for a long time.

To clean a terminal, use a clean soft cloth dampened with water. Do not use abrasive paper, cloth, or abrasive/corrosive cleaners. Wipe the entire terminal, except for the scanner window, with the damp cloth, including the charging contacts.

Wipe the scanner window periodically with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.

## Storage

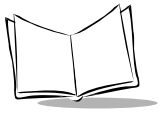
If the terminal will not be used for a while, store it in a cool, dry place, away from dust. For the best protection, repack the terminal in the original shipping container for storage.

### ***Caution***

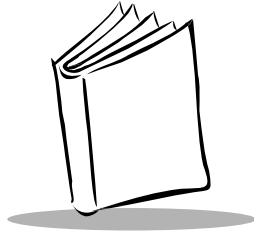
If you remove the primary battery, the terminal maintains memory contents for at least 15 minutes. To prevent loss of programs and data, transmit them to a host computer before removing the primary batteries for longer than 15 minutes.

When you remove the Series 68XX terminal from storage without the battery pack, reset the real time clock. Refer to the *Series 3000 Application Programmer's Reference Manual* or *Series 3000 Application Programmer's Guide* for specific instructions.





*Series 68XX Product Reference Guide*



## *Chapter 7*

# *Error Recovery and Troubleshooting*

This chapter provides information to assist in basic trouble analysis and correction, including:

- ◆ Error messages
- ◆ Troubleshooting start-up failures
- ◆ Troubleshooting Spectrum24 terminal initialization failures
- ◆ Running the self test function
- ◆ Self test summaries
- ◆ Keyboard test
- ◆ Scanning problems
- ◆ Running memory transfer.



## Error Messages

---

If ERR3000 is loaded in the system configuration, the terminal displays the following messages to indicate error conditions that affect system performance. A message is usually accompanied by one or more beeps, after which the system returns to its previous status.

The application can change the actual wording of the messages or disable messages. The messages listed in [Table 7-1](#) are representative. Refer to the *Series 3000 Application Programmer's Guide* or your application guide for additional information.

**Table 7-1. Error Messages**

Message	Explanation
Double Key Error	Two or more keys were pressed at the same time.
Low Battery	The battery pack should be recharged or replaced as soon as possible.
Dead Battery	Replace or recharge the battery pack immediately. This message is programmable, so it may be worded differently. See your application guide. After this message is displayed, the terminal shuts itself off.
Power Fault	The last terminal power off was caused by a terminal power failure. Possible causes of a power fault include: <ul style="list-style-type: none"><li>• the battery pack is removed with the terminal on.</li><li>• the terminal is dropped.</li><li>• the batteries lose power suddenly.</li><li>• the terminal displays a low battery power error message, and you attempt to power the terminal on without recharging or replacing the batteries.</li></ul>

## Troubleshooting Guide

[Table 7-2](#) lists some minor problems, causes, and actions to take. If you cannot resolve the problem after checking this list, call the Symbol Support Center for assistance.

**Table 7-2. Troubleshooting the 6800**

Symptom	Possible Cause	Action
Display is blank.	Battery pack is dead or missing.	Replace or recharge battery pack.
Terminal does not respond when keys are pressed.	Application program was not successfully downloaded.	Repeat downloading.
Time and date are incorrect.	Real-time clock has malfunctioned or needs setting.	Set time and date. See your application guide.

### Startup Failure

Problems are most frequently start-up failures. If cold booting the terminal does not start the application successfully, either the application, the system software, or the system is malfunctioning. If you can boot the system to Command Mode, try the following:

- ◆ Use Program Loader to download a new version of the software to NVM. This procedure is described in [Chapter 3, Batch and Spectrum One Terminal Setup](#). After downloading new software, warm boot the terminal as described in [Chapter 5, Operating the Series 68XX](#).
- ◆ Use Self Test to check whether system hardware is operational. The Self Test procedure is described later in this chapter.

### Boot Failure Messages

During a cold boot, the system briefly displays a status line for each driver as it loads, in the format

```
0:Driver    #.##
```

The line shows a status value, usually 0, followed by the name and version number of the driver. If the system halts at one of these lines and displays a status value other than 0, the displayed driver did not load properly.



If such a failure occurs, cold boot the terminal again. If this does not solve the problem, call Symbol Customer Support.

More troubleshooting information is found in the documentation listed in *Related Publications*.

## Spectrum24 Terminal

Typical initialization and operating problems and solutions for Spectrum24 terminals are provided in [Table 7-3](#).

Table 7-3. Troubleshooting Spectrum24 Terminals

Problem	Explanation/Action
Out of range	Terminal is out of the Access Point's range. If you move the terminal during initialization, the terminal may be out of range of the AP and unable to complete the initialization process. Move back in range and repeat the initialization process.
Startup process fails	Boot server type (BOOTP or DHCP) doesn't exist. Verify that the boot server is operating and able to respond to TCP/IP, BOOTP, or DHCP requests from the terminal.
Low battery message.	Place the terminal in a cradle and recharge battery. <b>OR</b> Power terminal off and replace battery.
Battery is dead.	Battery not replaced after receiving low battery message or terminal left on for more than 24 hours. Recharge or replace the battery.
Terminal disassociated from Access Point.	Application does not respond to interactive operations. Applications using internal batch mode continue to function until required to transmit via radio, then fail to work. No message displayed.

## Self Test Function

---

Command mode includes a Self Test function which verify that terminal hardware components are operating properly. Components tested include:

- ◆ Real-time clock (RTC)
- ◆ Battery power
- ◆ Keyboard codes
- ◆ Liquid crystal display (LCD) controller
- ◆ Read-only memory (ROM), random-access memory (RAM), expanded memory (EMS), and non-volatile memory (NVM) CRC.

Run self test if you suspect a problem with the hardware. Except for keyboard testing, no operator input is necessary after selecting a test screen.

### Running Self Test

Access the Self Test function from the Command Mode Menu:

1. Boot to Command Mode (refer to [Chapter 5, Operating the Series 68XX](#), for boot sequences).
2. At the Command Mode Main Menu, use the **UpArrow** or **DownArrow** to scroll through the options.
3. Highlight **Self Test** and press <Enter>.

Press <CLR> in any self test screen to return to the Self Test screen, or from the Self Test screen to return to the Command Mode screen.

### Self Test Summaries

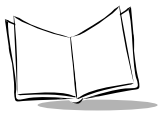
Self test is divided into five functions or screens:

**Config Screen 1.** Reports the terminal series, BIOS version, battery status, and current power source.

**Config Screen 2.** Reports information on the keyboard and display, including power wakeup source.

**Memory Screen.** Reports the amount of installed RAM and EMS, and the test results.

**Set RTC Screen.** Sets the time and date settings of the real-time clock.



## Keyboard Test

Keyboard testing can be performed while the terminal displays Config Screen 1 results.

Test any keys except **CLR** and **PWR**. When you press a key, the corresponding key code is displayed on the top row to the right of the test name. [Table 7-4](#) lists the codes for the 46-key keyboard.

**Table 7-4. 46-Key Keyboard Test Codes**

Key	Test Code	Key	Test Code	Key	Test Code
Func	01	M	17	Period	32
Shf	02	N	18	Up arrow	33
Ctl	03	O	19	Down arrow	34
A	05	P	20	7	35
B	06	Q	21	8	36
C	07	R	22	9	37
D	08	S	23	4	38
E	09	T	24	5	39
F	10	U	25	6	40
G	11	V	26	1	41
H	12	W	27	2	42
I	13	X	28	3	43
J	14	Y	29	0	44
K	15	Z	30	Enter	45
L	16	Bksp	31		

If numbers other than those given in the tables appear on the display, please contact your authorized representative. Press **CLR** to terminate the test and return to the SelfTest screen.

## Memory Transfer Program

---

Command Mode includes a memory transfer utility that transfers data from a terminal to a host PC for program troubleshooting. Programmers can analyze an application using tools provided in the Series 3000 Application Development Kit and described in the *Series 3000 Application Programmer's Reference Manual*.

### Hardware Setup

1. Turn off the terminal and host PC. Disconnect or unplug the cradle, if used.

#### **Caution**

Always power off the terminal before attaching or removing cables or adapters.

2. Connect an RS-232 null modem cable to the PC's serial port.
3. Connect the other end of the cable to the cradle's communication port.
4. Connect the cradle to a power source.
5. Place the terminal in the cradle.
6. Power on the host PC.

### Set Communications Parameters

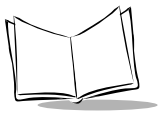
#### Host

1. Start the communications program, such as DMX or RCVHEX.EXE from the *Series 3000 Application Development Kit*.
2. Set up the host communication parameters (these parameters must match the terminal's parameters). Refer to the data transfer program's operator's manual for details.

#### Terminal

1. Boot the terminal to Command Mode (refer to [Chapter 5, Operating the Series 68XX](#) for the appropriate key sequence).
2. Select the Memory Transfer function from the Command Mode menu. Use **UpArrow** or **DownArrow** to scroll through the Command Mode options until Memory Transfer is displayed and press <**ENTER**>.





3. Select the range of memory to transfer by pressing the first letter of the desired range (**All**, **Range**, or **None**), or use the **UpArrow** or **DownArrow** and press **<ENTER>**.  
If you select **All**, the program skips to the range verification screen (step 7).

If you select **Range**, the screen displays:

```
RAM
Use Arrow Keys
Start      End
00000     9FFFF
```

4. Specify a range of RAM by setting the Start and End addresses.  
Use **RightArrow** and **LeftArrow** to move the cursor to the digit to be changed.  
Use **UpArrow** and **DownArrow** to change the values.

Type a range and press **<ENTER>**.

5. Specify a range of NVM to transfer. Choose **All** or **None**.
6. If the system has EMS installed, it prompts for the range to transfer; otherwise, it skips this screen:

```
EMS

Use arrow keys
Start          End
```

The range is specified in page numbers (16 KB per page). Use **RightArrow** and **LeftArrow** to move between the Start and End values. Use **UpArrow** and **DownArrow** to change the page number value.

Set the range and press **<ENTER>**.

7. The terminal displays a range verification screen.  
For example:

```
RAM    0000    3FFF
NVM    D510    DFFF
EMS    0000    010
Correct? <ENT>
```

If the values are correct, press **<ENTER>**. If the values are not correct, press **<CLR>** to clear the fields and select new values.

- Specify the baud rate. Use the **UpArrow** and **DownArrow** to scroll through the list of baud rates until the correct rate is displayed and press **<ENTER>**.

---

**Note:** *Flow control may be necessary at 38400 bps and higher.*

---

- Specify the data bits. Press **<7>** or **<8>**, or use **UpArrow** and **DownArrow** to display the values 7 or 8 and press **<ENTER>**.

---

**Note:** *If you select 8 data bits, the program selects No parity and skips the next screen.*

---

- Specify parity type. Use **UpArrow** and **DownArrow** to display a parity option, or press the first letter of a parity option (**E**ven, **O**dd, **N**one, **S**pace, or **M**ark) and press **<ENTER>**.
- Set flow control. Use **UpArrow** and **DownArrow** to display the flow control options, or press the first letter of an option (**N**one, **X**on/Xoff, or **R**TS/CTS) and press **<ENTER>**.

## Start Communications

- The terminal is ready to send the data to the host PC and displays:

Comm Parameters  
Start? <ENT>

- Verify that the host is ready to receive data.
- Press **<ENTER>** on the terminal.

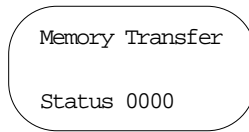
While data is being transferred, the terminal displays a report of the 1 KB range being transferred:

Memory Transfer  
Sending: XXXX

The display is updated for every 1024 bytes (1 KB) of memory.



4. When the transmission completes or aborts, the terminal displays the transmission status screen:



A status of 0000 (all zeros) indicates that the transfer was successful. Any other status indicates failure. Refer to [Appendix B, \*Communications Status Codes\*](#), for the status codes which indicate the source of the error.

## End Communications

To return to the Command Mode Main Menu, press <CLR>. Take whatever corrective action is necessary and reboot the terminal.

## Scanning Problems

---

### **What If...**

*Nothing happens when you follow the operating instructions?*

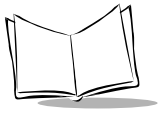
- ◆ Check the system power.
- ◆ Verify that the scanner is programmed to read the symbology you are trying to read.
- ◆ Try scanning a test symbol of the symbology you are trying to read.
- ◆ Check the bar code to ensure that it is not defaced. A defaced bar code may not be readable.
- ◆ Check to see that you are scanning from the proper distance.

*Your terminal operates but scanned data is not displayed correctly?*

- ◆ Check the system power.
- ◆ Check that the communications parameters (baud rate, parity, stop bits, etc.) are set properly for the receiving device.

*The laser does not activate?*

- ◆ You may have exceeded the allowable amount of scanning activity within the limits of your laser class of operation; in this case, wait for a short interval before scanning again.
- ◆ You may be scanning in an inappropriately hot environment. If so, remove the equipment from the environment or allow the laser to cool down.



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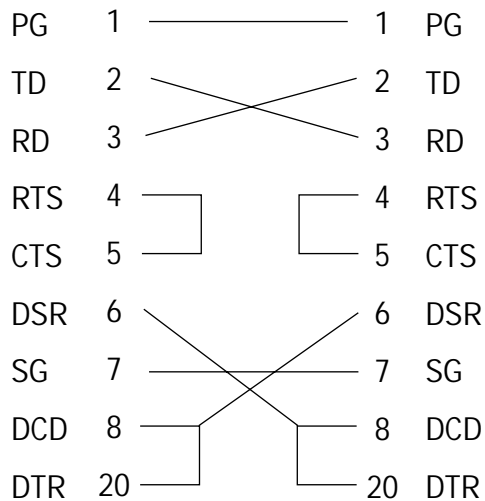
## Appendix A

### *Null Modem Pin-outs*

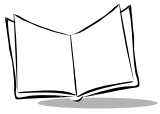
#### Null Modem Pin-Outs for Full Duplex

---

Use the pin-outs shown in [Figure A-1](#) for null modem communication.



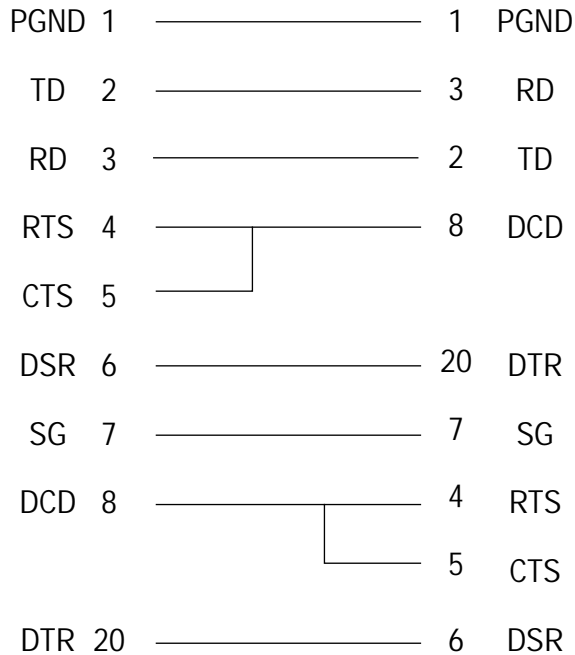
**Figure A-1. Null Modem Pin-Outs - Full Duplex**



## Null Modem Pin-outs for Half-Duplex

---

Use the pin-outs shown in [Figure A-2](#) for testing.



**Figure A-2. Null Modem Pin-Outs - Half Duplex**



## *Appendix B*

### *Communications Status Codes*

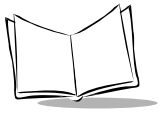
The program loader status code consists of four hexadecimal digits which indicate whether or not the transfer was successful, and if not, the source of the communications error. A status code of 0000 indicates success; any other code indicates failure.

[Table B-1](#) lists the failures associated with the status codes. The values are additive.

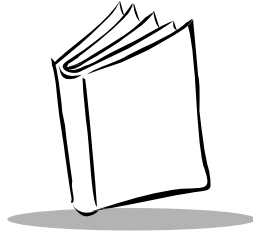
**Table B-1. Communications Status Codes**

<b>Status Code</b>	<b>Meaning</b>
0002	Receive overrun error
0004	Receive parity error
0008	Receive framing error
0010	Programming voltage not present
0020	Data Set Ready or Carrier Detect not detected on open
0080	ABORT key hit during comm
0100	Insufficient NVM for image
0200	Illegal Intel hexadecimal record
0400	Unsupported Intel record
0600	NVM EEPROM failed to erase
0800	Receive time-out error
1000	Control start character time-out
2000	Clear To Send inactive time-out error
4000	Receive buffer full





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## Appendix C Specifications

### Environment

---

The terminal's operating conditions are listed in [Table C-1, Environmental Specifications](#).

**Table C-1. Environmental Specifications**

Condition	Range
Operating Temperature	-13°F to 122°F (-20°C to 50°C)
Storage Temperature	-13°F to 140°F (-20°C to 60°C)
Humidity (Operating)	95% relative humidity, noncondensing
Altitude	Up to 10,000 feet
Electrstatic	Up to 15 KV discharge to all surfaces (terminal power may go off)
Shock	Withstands multiple 4-foot drops to concrete without malfunction or loss of data

---

**Note:** *Batteries lose power faster at extremely high and low temperatures, and at temperatures below 0°C, the LCD operates slowly.*

---



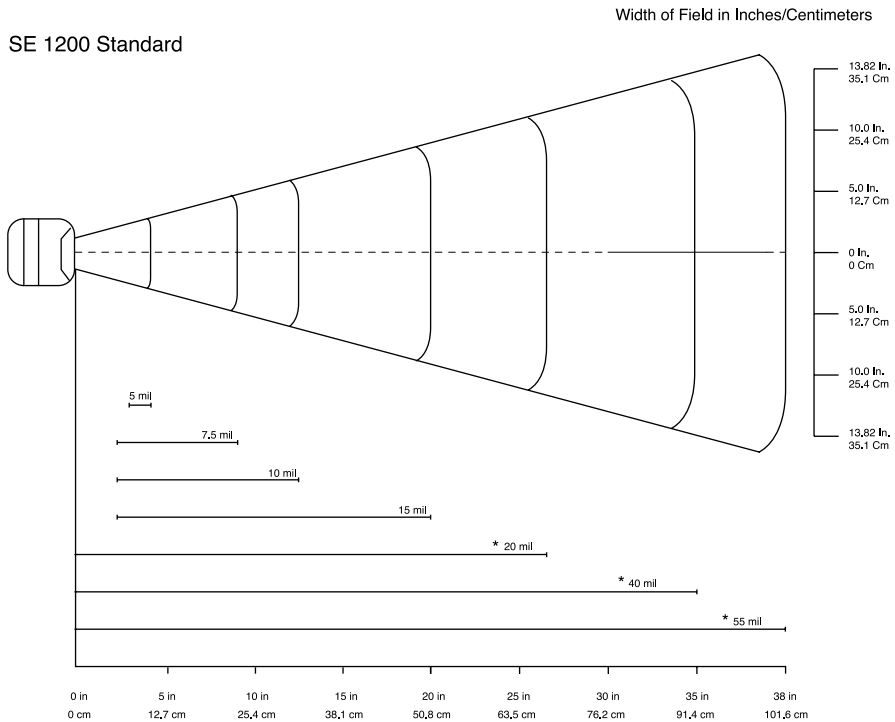
## RF Communications

---

Specification	Spectrum One (6810)	Spectrum24 (6840)
<b>Spreading Technique</b>	Direct sequence	Frequency hopping
<b>Data Rate</b>	60.6 Kbps	1 Mbps
<b>Range: Open Space</b>	1500 feet/454 meters	Up to 1000 feet/303 meters
<b>Frequency Range</b>	902-928 MHz	Country dependent. Typically 2.4 to 2.5 GHz
<b>Output Power</b>	250 mW	500 mW (US) 100 mW (International)
<b>Ethernet Compatibility</b>	through NCU	Dix Ethernet
<b>Radio Channel Access Method</b>	CSMA/CA	CSMA/CA

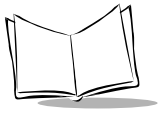
# Scanning Decode Zones

## Standard

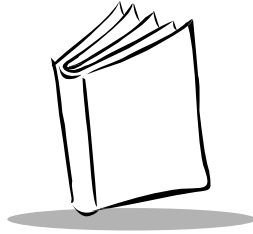


Typical Depth of Field in Inches/Centimeters

\* Minimum distance determined by Symbol length and scan angle



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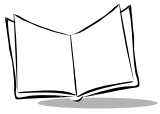


## *Appendix D*

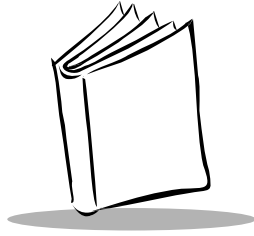
### *Boot-Up Quick Reference*

Table D-1. 46-Key Boot Procedures

Boot Type	Key Sequence	Used For	Results
Power On	<b>PWR</b> , or Trigger, or remove terminal from cradle	Normal power on	Returns terminal to where it was when it was turned off.
Warm Boot	<b>4 5 PWR</b>	Lets you choose a program that resides in NVM.	If system software is present, returns terminal to DOS. Otherwise, returns terminal to command mode. Retains contents of RAM.
Cold Boot	<b>A B D PWR</b>	Resetting BIOS and the operating system.	Erases and recreates RAM disk. Only data in NVM is retained.
Command Mode Start	<b>F I PWR</b>	Entering command mode for self-test or communication	Takes terminal to beginning of command mode. The first time you turn the terminal on or after the terminal has been stored without batteries, acts the same as a Cold Boot (resets BIOS, loses contents of RAM).



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## Appendix E

# *Spectrum24 Network and Flash Disk Utilities*

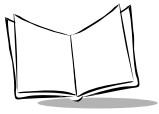
### Introduction

---

Some supplemental utilities are provided for working with the flash disk in addition to the Flash disk driver and utilities described in the *Series 3000 ADK*. These utilities include:

<b>CFG24</b>	executes from a DOS prompt to change parameters for radio communications.
<b>DIAG24</b>	executes from a DOS prompt to test radio connectivity and performance.
<b>BOOTP</b>	is automatically executed by the start-up procedure. Obtains IP address and sets up communications parameters. Should NOT be executed from a DOS prompt.
<b>STAT24</b>	is automatically executed by the start-up procedure. Indicates the status of the radio connection. Should NOT be executed from a DOS prompt.
<b>FLASH.BAT</b>	facilitates performing flash disk housekeeping functions, such as copying files to, deleting files from, and renaming files on the flash disk. Executes from a DOS prompt.





## CFG24

---

The CFG24 utility enables the terminal operator to configure radio communications parameters. This utility must be run after the radio driver loads because the configuration parameters are saved in the radio card's flash memory, which is accessed using the radio driver services.

This program uses the text message file **MSG.MSG** which is read from the same drive and directory as the CFG24 executable (CFG24.COM). Corrupted screens are an indication that the message file was not found.

To ensure that all changes to parameters entered in CFG24 take effect, reinitialize (warm boot) the 6840 after exiting.

---

**Note:** *Changes to certain parameters (e.g., Terminal IP Address) do not take effect until the TCP/IP stack is reloaded. Changes to other parameters (e.g., Diversity) do not take effect until the driver is reloaded.*

---

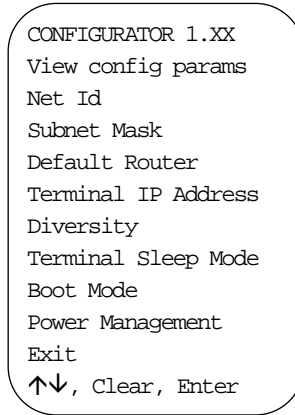
## Syntax

CFG24

## Description

CFG24 provides menus for editing the radio configuration parameters used to communicate in a Spectrum24 network. These values are saved in a buffer in the radio card's flash memory. The current parameters are set in the file **NET.CFG** on the RAM disk. NET.CFG is used by both the radio driver and the TCP/IP stack to obtain their configuration parameters.

Initially, CFG24 presents the main menu shown in [Figure E-1](#).

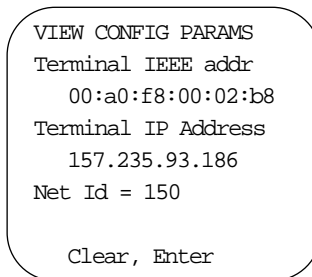


**Figure E-1. CFG24 Main Menu**

The current selectable option appears in reverse video. Because the 684X has an 8-line display, the top, bottom, and first lines of the menu are shown, and the remaining lines are viewed by scrolling. Use the **↑↓** keys to scroll through the options on the menu. Press **<ENTER>** to select an option. Press **<CLEAR>** to exit the menu (from this screen, has the same effect as selecting **Exit**).

1. To view the Series 684X's default parameters, select VIEW CONFIG PARAMS ([Figure E-2](#)).

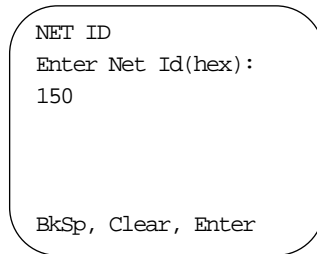
This screen is for display only; it is not a data entry screen. Use it to review the terminal's IEEE (or MAC) address, IP address, and Net Id. Press **<CLEAR>** or **<ENTER>** to return to the main menu.



**Figure E-2. View Configuration Parameters Screen**



2. Select **Net Id** from the CFG24 Menu. The *Net Id* screen (Figure E-3) is displayed.



```
NET ID
Enter Net Id(hex):
150

BkSp, Clear, Enter
```

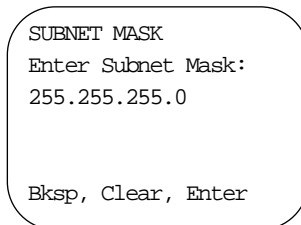
**Figure E-3. Net Id Screen**

The Net Id identifies the radio network and differentiates between different radio networks. All equipment on one network must use the same Net Id.

To change the current Net Id value, backspace over the current value and type a new value, in hexadecimal format, in the range 101 to 1FE. Alphabetical hex values can appear in upper or lower case.

Press **<ENTER>** to effect the change. Press **<CLEAR>** to exit without changes.

3. Select **Subnet Mask** from the main configuration menu. The *Subnet Mask* screen (Figure E-4) is displayed.



```
SUBNET MASK
Enter Subnet Mask:
255.255.255.0

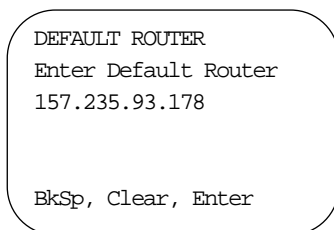
Bksp, Clear, Enter
```

**Figure E-4. Subnet Mask Screen**

To change the current Subnet Mask setting, backspace over the current value and type a new value, in decimal form. Each part of the four-part address must be in the range 0 to 255.

Press **<ENTER>** to effect the change. Press **<CLEAR>** to exit without changes.

4. Select **Default Router** from the main configuration menu. The *Default Router* screen (Figure E-5) is displayed.



```
DEFAULT ROUTER
Enter Default Router
157.235.93.178

BkSp, Clear, Enter
```

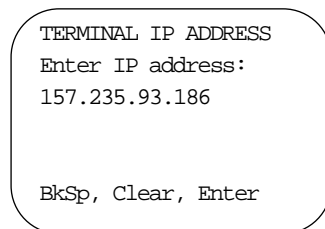
Figure E-5. Default Router Screen

The default router address is the address of the node where all packets going to remote networks are sent.

To change the current Default Router setting, backspace over the current value and type a new value, in decimal form. Each part of the four-part address must be in the range 0 to 255.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.

5. Select **Terminal IP Address** from the main configuration menu. The *Terminal IP Address* screen (Figure E-6) is displayed.



```
TERMINAL IP ADDRESS
Enter IP address:
157.235.93.186

BkSp, Clear, Enter
```

Figure E-6. Terminal IP Address Screen

---

**Note:** *Entering a Terminal IP Address is necessary only if IP addresses are not being allocated by a boot server. IP address allocation is part of the BOOTP and DHCP process.*

---



To change the current Terminal IP Address, backspace over the current value and type a new value in decimal form. Each part of the four-part address must be in the range 0 to 255.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.

6. Select **Diversity** from the main configuration menu. The *Diversity* screen (Figure E-7) is displayed.

```
DIVERSITY
2 antennas (Yes/No)
Yes
↑↓, Clear, Enter
```

Figure E-7. Diversity Screen

If Diversity is set to “Yes”, the radio firmware attempts to use both antenna ports for communications. For the Series 684X, set Diversity to “No”.

To change the current Diversity setting, use the ↑↓ cursor keys to toggle between the settings “Yes” and “No”.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.

7. Select **Terminal Sleep Mode** from the main configuration menu. The *Terminal Sleep Mode* screen (Figure E-8) is displayed.

```
TERMINAL SLEEP MODE
Radio state:
On
↑↓, Clear, Enter
```

Figure E-8. Terminal Sleep Mode Screen

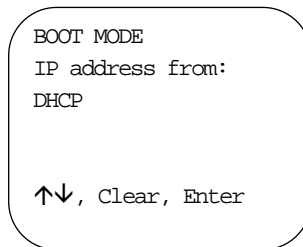
If this switch is set “On”, the radio is not powered off when an application powers down the terminal because of inactivity. The terminal can be awakened by a message directed to it, but not by a broadcast message. If the switch is set to “Off”, the radio

is powered off when an application powers down the terminal because of inactivity. The default setting is “On”.

To change the current Terminal Sleep Mode, use the  $\uparrow\downarrow$  keys to toggle between the “On” and “Off” settings.

Press <ENTER> to effect the change. Press <CLEAR> to exit without changes.

8. Select **Boot Mode** from the main configuration menu. The Boot Mode screen ([Figure E-9](#)) is displayed.

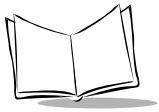


**Figure E-9. Boot Mode Screen**

If boot mode is set to “Manual Entry”, no configuration messages are broadcast to the network. The current values of the network parameters which are saved in the radio’s flash, are used to connect to the network. “Manual entry” is the default.

If boot mode is set to “Boot” when the 6840 is initialized, a TCP/IP BOOTP request message is broadcast to the network. Any boot servers on the network should response if configured to do so. The terminal accepts the first valid response received. The response contains an IP address for the terminal’s use, and optionally, other network parameters. Parameters received in this BOOTP response override any parameters entered through CFG24.

If boot mode is set to “DHCP” when the terminal is initialized, the process is the same as for BOOTP, except the Dynamic Host Configuration Protocol is used.



Symbol's BOOTP program accepts setting the following network parameters from the BOOTP and DHCP parameters:

- Sub-net Mask
- Default Router (first address from the router list)
- Terminal IP Address

To change the current boot mode setting, use the  $\uparrow\downarrow$  keys to toggle between the three valid settings.

Press **<ENTER>** to effect the change. Press **<CLEAR>** to exit without changes.

9. Select **Power Management** from the main configuration menu. The *Power Management* screen ([Figure E-10](#)) is displayed.

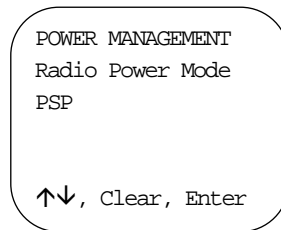


Figure E-10. Power Management Screen

If power management is set to PSP (default), the radio is powered up only when there is traffic on the network. This mode adapts to the radio activity to determine how long the radio is powered down. Because the radio is not always in a ready state when a message is sent to it, using PSP mode slows response times.

If power management is set to CAM, the radio is always ready to receive. In this mode, battery life is dramatically reduced.

To change the current power management setting, use the  $\uparrow\downarrow$  keys to toggle between the two settings.

Press **<ENTER>** to effect the change. Press **<CLEAR>** to exit without changes.

10. Select *Exit* from the main configuration menu and press **<ENTER>** to exit the configurator and get to a DOS prompt.
11. Cold boot the 6840 to reinitialize the terminal with the changed parameters.

## BOOTP

---

The BOOTP program gets the IP address and sets up communications parameters for use by other parts of the system. How the program works depends on which boot mode setting was selected in CFG24, as follows:

- ◆ If “Boot” was selected, a TCP/IP BOOTP request is broadcasted to the network. Boot servers on the network configured to respond send a response. The terminal accepts the first valid response received, which contains a terminal IP address and other network parameters which over-ride any parameters entered through CFG24.
- ◆ If “DHCP” was selected, a similar process to the one described for BOOTP occurs, only using the Dynamic Host Configuration Protocol.
- ◆ If “Manual entry” was selected, no configuration messages are broadcast to the network and the current network parameters, saved in the radio flash, are used for connecting to the network.

BOOTP uses the text message file **MSG.MSG**, read from the same drive and directory as the executable, **BOOTP.COM**. Corrupted screens are an indication that the message file was not found.

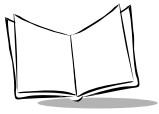
### *Description*

BOOTP is responsible for updating NET.CFG, a standard file used by the TCP/IP software to set communications parameters. In NET.CFG, BOOTP includes any communication parameters returned by a server in the BOOTP or DHCP processes, or sets these parameters as configured through CFG24.

The priority of the various sources of communication parameters is as follows:

1. Any value returned by the BOOTP or DHCP process.
2. Any value entered through CFG24.
3. A previous value used and saved in the radio flash area.
4. The default value for that parameter, located in the original NET.CFG supplied with the system software.





## Output

The following parameters in the radio flash save area are updated if changed by a BOOTP or DHCP process:

<b>Sub-network Mask</b>	BOOTP or DHCP response may change the subnet mask. If no change is received from the BOOTP or DHCP response, uses the default of 255.0.0.0.
<b>Default Router</b>	Default router's IP address. The first router address is saved from the list returned by DHCP or BOOTP.
<b>Terminal's IP Address</b>	Saved in the radio flash so it is preserved through a terminal reinitialization.

The following environment variables are set:

<b>YIADDR</b>	Terminal's IP address in dotted format (e.g., 157.235.93.186).
<b>SIADDR</b>	Boot server's IP address in dotted format (e.g., 157.235.93.178).
<b>DNSADDR</b>	Domain name server's IP address. Only the first domain server IP address is saved from the list returned by BOOTP or DHCP.
<b>BTPATH</b>	File path on server where boot file can be found.
<b>BTFILE</b>	File name of boot file.

## STAT24

---

STAT24 is a Terminate and Stay Resident (TSR) program used to provide the status of the radio connection. It can also be used to check for RF association and alternate actions in batch files depending on the association status. This utility is used mainly to check for associations with an AP when RF difficulties are experienced. Some applications may unload the STAT24 TSR if they cannot afford the program execution space it occupies.

STAT24 uses the text message file **MSG.MSG**, read from the same drive and directory as the executable, **STAT24.COM**. Corrupted screens are an indication that the message file was not found.

STAT24 is loaded during standard start-up procedures. To view the STAT24 pop-up screen (Figure E-11), press the hot-key sequence <CTRL+FUNC+1>.

### Description

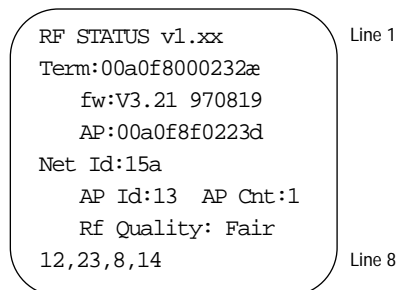
In the standard terminal initialization procedure, when the system software is loaded and connection to the RF network is attempted, STAT24 is used in two different ways:

- ◆ the program loops until the terminal either associates with an Access Point (AP) or times out. By default the default time-out is 10 seconds.
- ◆ the program installs itself as a TSR and provides a hot-key sequence that pops up a display of the current radio connection status and radio quality for the previous minute (refer to Figure E-11). When in this pop-up mode, the program returns to the application screen if any key is pressed.

---

**Note:** *This program can be unloaded due to application memory constraints, if required.*

---



```

RF STATUS v1.xx
Term:00a0f8000232æ
    fw:V3.21 970819
    AP:00a0f8f0223d
Net Id:15a
    AP Id:13  AP Cnt:1
    Rf Quality: Fair
12,23,8,14

```

Figure E-11. STAT24 Screen



The fields in [Figure E-11](#) are interpreted as follows:

- |               |   |
|---------------|---|
| <b>Line 1</b> | Title and version number of STAT24.   |
| <b>Line 2</b> | The terminal's IEEE address.  |
| <b>Line 3</b> | The version and date of the adapter firmware.   |
| <b>Line 4</b> | The IEEE (MAC) address of the Access Point the terminal is associated with.   |
| <b>Line 5</b> | The Net Id for the network.   |
| <b>Line 6</b> | The AP identifier of the AP the terminal is associated with.  |
| <b>Line 7</b> | A qualitative statement about the radio transmissions over the previous minute. The analysis is simplistic and takes no account of how much other radio traffic there may be. The judgements are essentially for a terminal in a quiet environment: what is poor for a single terminal may be good in a heavy traffic environment. The range of statements is "Good", "Fair", and "Poor". |
| <b>Line 8</b> | Four values used to derive the quality judgement provided in line 7. In order, they represent for the last full minute: <ul style="list-style-type: none"><li>♦ total packets transmitted</li><li>♦ total packets received</li><li>♦ percent error packets transmitted</li><li>♦ percent error packets received</li></ul>   |

## DIAG24

---

DIAG24 is intended for use in two situations:

- ◆ As a connectivity tool, using a ping that is not re-tried on transmission errors. This test is intrusive as pings are sent as fast as possible.
- ◆ As a diagnostic tool for potential radio problems. It can eliminate or confirm that the traffic problems are in the radio portion of the network. The round-trip time reported during the test indicates the portion of the transaction response time that is attributable to the radio network.

This program uses the text message file **MSG.MSG** which is read from the same drive and directory as the executable (DIAG24.EXE). Corrupted screens are an indication that the message file was not found.

### Syntax

DIAG24

### Description

To run DIAG24 on a 6840:

1. At a DOS prompt on the terminal, type:

DIAG24

and press <ENTER>.

The menu shown in [Figure E-12](#) is presented.

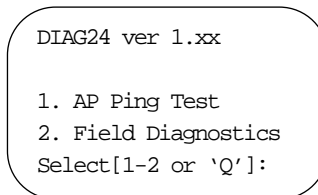
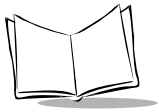


Figure E-12. DIAG24 Screen



---

**Note:** Press **Q** in any subsequent menu to return to the **DIAG24** menu or to exit **DIAG24** from this menu.

---

2. Press either (1) AP Ping Test or (2) Field Diagnostics. Press **Q** to quit.

Whichever mode was selected from the **DIAG24** menu, the subsequent set-up menus that follow are identical, except for the title line which indicates the selected test mode: **AP PING TEST** for selection 1; **FIELD DIAGNOSTICS** for selection 2 (see [Figure E-13](#)).

```
<Test Mode>
1. Roaming Enabled
2. bb--eeeeeeeeeeee
3. bb--eeeeeeeeeeee
:::
:::
n. bb--eeeeeeeeeeee
Select [1-n or 'Q']:
```

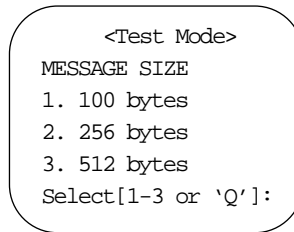
**Figure E-13. Test Mode Screen**

3. Select the roaming mode. For each AP listed by line number:

<b>bb</b>	represents the AP identifier (or BSS identifier)
<b>eeeeeeeeeeee</b>	is the 48-bit MAC address of the AP in hexadecimal notation.

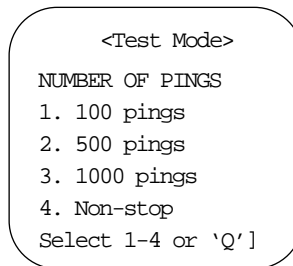
- ♦ If you select Roaming Enabled, the terminal pings the associated AP and roams as required between APs.
- ♦ If you select a specific AP in the list, the test is conducted solely with that AP.
- ♦ If more APs are in range than can fit on one screen, the last selection is “More”. Select this to present more APs for selection.

4. To exit the screen select **Q** or press **<CLEAR>**.



**Figure E-14. Ping Message Size**

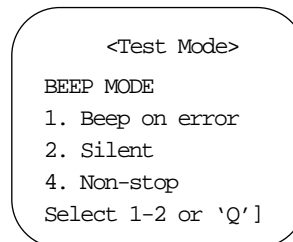
5. Select the ping message size in the *Message Size* screen shown in [Figure E-14](#). Press the corresponding number to make the selection and advance to the next screen. Press **Q** or **<CLEAR>** to return to the main menu.



**Figure E-15. Number Of Pings Screen**

6. Select a counter for the number of test iterations in the *Number of Pings* screen shown in [Figure E-15](#). Press the corresponding number to make the selection and advance to the next screen.

Press **Q** or **<CLEAR>** to return to the main menu.



**Figure E-16. Beep Mode Screen**



7. Select whether to sound a beep if an error is encountered in the *Beep Mode* screen shown in [Figure E-16](#). Press the corresponding number to make the selection and advance to the test screens.

Press **Q** or **<CLEAR>** to return to the main menu.

## Ping Tests

During an AP ping test, the screen shown in [Figure E-17](#) is displayed and continuously updated.

AP PING TEST					
A	Cnt	Err	AP	RS	
	56	2	04	36	
	57	2	04	36	
	58	3	04	36	TMO
	59	3	04	36	
	55	2	04	36	
Press 'Q' to Quit					

**Figure E-17. AP Ping Test Results**

Each ping results in a new line being displayed, showing the cumulative ping count, error count, AP identifier of the AP the terminal is associated with, and the RSSI value of the terminal reception. If there was an error, an indicator appears at the right-hand end of the line (see line 5 in [Figure E-17](#)). The report wraps around so that, at any given time, the last five message reports are visible.

The 'A' at the left end of line 2 in [Figure E-17](#) indicates that the terminal is associated with an AP. A 'U' indicates that the terminal is not associated.

When the ping test is running in non-stop mode, if either of the count fields overflows, the first detail line is pre-empted to show the most significant digits of the count, prefixed with an asterisk (Figure E-18).

AP PING TEST					
A	Cnt	Err	AP	RS	
*	6	* 2	04	36	
	57	2	04	36	
	58	3	04	36	TMO
	59	3	04	36	
	55	2	04	36	
Press 'Q' to Quit					

Figure E-18. AP Ping Test Results (Non-Stop Mode)

In Figure E-18, the first detail line reads “\*6\*2...” showing that the real values for the counters in the second and subsequent detail lines are 600, 057, and 2,002.

Press <Q> or <CLEAR> to terminate the test and return to the DIAG24 menu.

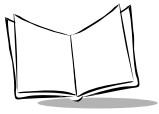
AP PING TEST	
Total secs =	7.4
Pings =	100
Packet size =	100
Retries =	0
Timeouts =	4
[R]repeat or [Q]uit	

Figure E-19. AP Ping Test Summary

When the ping test is stopped, the summary screen (Figure E-19) is displayed, showing the elapsed time of the test, total pings transmitted, packet size used, retry count, and number of timeouts. To repeat the test with the same parameters, press <R>.

Press <Q> or <CLEAR> to terminate the test and return to the DIAG24 menu.





## Field Diagnostics

During a field diagnostic test, the screen shown in [Figure E-20](#) is displayed and continuously updated.

FIELD DIAGNOSTICS					
A	Cnt	Err	Rty	ms	AP
56	2	0	165	52	
57	2	0	55	52	
58	3	1	TMO	52	
59	3	0	220	52	
55	2	0	55	52	
Press 'Q' to Quit					

Figure E-20. Field Diagnostics (Screen 1)

Each ping results in a new line being displayed, showing the cumulative ping count, error count, retry count for this message, round-trip time in milliseconds for this message or indication of error type if there was an error, and the AP identifier of the AP that responded to the message.

When the test stops, a summary screen is displayed ([Figure E-21](#)).

FIELD DIAGNOSTICS	
Total secs = 8.2	
Pings = 100	
Packet size = 512	
Retries = 6	
Timeouts = 4	
[R]epeat or [Q]uit	

Figure E-21. Field Diagnostics Summary Screen

Press **<Q>** or **<CLEAR>** to terminate the test and return to the DIAG24 menu.

## FLASH.BAT

---

The FLASH.BAT utility facilitates copying files to and deleting files from flash disk, and renaming files on the disk. The batch file takes care of switching to write mode on flash disk and restoring read-only mode after the operation.

### ***Deleting Files from Flash Disk***

To delete files, use the command:

```
FLASH DEL <filename>
```

For example:

```
FLASH DEL CS1.CFG
```

deletes the Spectrum One compatibility layer configuration file, CS1.CFG, from the current directory of the flash disk, and

```
FLASH DEL \*.*
```

deletes all files in the flash disk's root directory.

---

**Note:** *There is no mention of the E: drive in the command*

---



## Copying Files to Flash Disk

To copy files to flash disk, use the command:

```
FLASH COPY <filename> \
```

For example:

```
FLASH COPY NET.CFG \
```

copies NET.CFG, the protocol stack configuration file, from the current directory (normally D:) to the root directory on flash disk, and

```
FLASH COPY E:\SVTP\CS1.CFG \STEP
```

copies CS1.CFG from the SVTP directory on flash disk to the STEP directory on flash disk.

---

**Note:** *In the second example, the E: drive must be mentioned on the first command parameter, but is assumed on the second parameter and must NOT be mentioned.*

---

## Renaming Files on Flash Disk

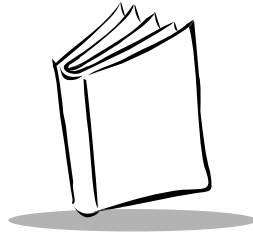
To rename files on the flash disk, use the command:

```
FLASH REN \<OLD FILE NAME> <NEW FILE NAME>
```

For example:

```
FLASH REN \NETCFG.1 NET.CFG
```

renames NETCFG.1 in the flash disk's root directory to NET.CFG. The standard restrictions on renaming files apply, e.g., NETCFG.1 must exist and NET.CFG must not exist in the directory before the command is executed.



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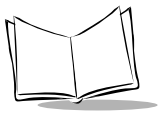
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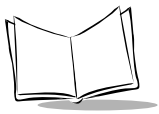
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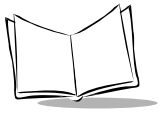
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